

PUBLICATIONS OF THE
NATIONAL BUREAU OF ECONOMIC RESEARCH, INC.

NUMBER 33

Some Theoretical Problems suggested by
THE MOVEMENTS OF INTEREST RATES,
BOND YIELDS AND STOCK PRICES
IN THE UNITED STATES SINCE 1856

Officers

JOSEPH H. WILLITS, Chairman
GEORGE SOULE, President
DAVID FRIDAY, Vice-President
SHEPARD MORGAN, Treasurer
JOSEPH H. WILLITS, Executive Director
W. J. CARSON, Assistant Executive Director
MARTHA ANDERSON, Editor

Directors at Large

CHESTER I. BARNARD, *President,*
New Jersey Bell Telephone Company
HENRY S. DENNISON, *Dennison Manufacturing Company*
GEORGE M. HARRISON, *President,*
Brotherhood of Railway and Steamship Clerks
OSWALD W. KNAUTH, *President, Associated Dry Goods Corporation*
HARRY W. LAIDLER, *Executive Director,*
The League for Industrial Democracy
L. C. MARSHALL, *Johns Hopkins University*
GEORGE O. MAY, *Price, Waterhouse and Company*
SHEPARD MORGAN, *Vice-President, Chase National Bank*
BEARDSLEY RUMI, *Treasurer, R. H. Macy and Company*
GEORGE SOULE, *Director, The Labor Bureau, Inc.*
N. I. STONE, *Industrial and Financial Consultant*

Directors by University Appointment

WILLIAM L. CRUM, <i>Harvard</i>	HARRY ALVIN MILLIS, <i>Chicago</i>
WALTON H. HAMILTON, <i>Yale</i>	WESLEY C. MITCHELL, <i>Columbia</i>
HARRY JEROME, <i>Wisconsin</i>	JOSEPH H. WILLITS, <i>Pennsylvania</i>

Directors Appointed by Other Organizations

FREDERICK M. FEIKER, *American Engineering Council*
DAVID FRIDAY, *American Economic Association*
LEE GALLOWAY, *American Management Association*
MALCOLM MUIR, *National Publishers Association*
WINFIELD W. RIEFLER, *American Statistical Association*
GEORGE E. ROBERTS, *American Bankers Association*
MATTHEW WOLL, *American Federation of Labor*

Research Staff

WESLEY C. MITCHELL, *Director*
ARTHUR F. BURNS FREDERICK R. MACAULAY
SOLOMON FABRICANT FREDERICK C. MILLS
SIMON KUZNETS LEO WOLMAN
EUGEN ALTSCHUL, DAVID L. WICKENS, *Associates*

RELATION OF THE DIRECTORS
TO THE WORK OF THE NATIONAL BUREAU
OF ECONOMIC RESEARCH

1. The object of the National Bureau of Economic Research is to ascertain and to present to the public important economic facts and their interpretation in a scientific and impartial manner. The Board of Directors is charged with the responsibility of ensuring that the work of the Bureau is carried on in strict conformity with this object.

2. To this end the Board of Directors shall appoint one or more Directors of Research.

3. The Director or Directors of Research shall submit to the members of the Board, or to its Executive Committee, for their formal adoption, all specific proposals concerning researches to be instituted.

4. No study shall be published until the Director or Directors of Research shall have submitted to the Board a summary report drawing attention to the character of the data and their utilization in the study, the nature and treatment of the problems involved, the main conclusions and such other information as in their opinion will serve to determine the suitability of the study for publication in accordance with the principles of the Bureau.

5. A copy of any manuscript proposed for publication shall also be submitted to each member of the Board. If publication is approved each member is entitled to have published also a memorandum of any dissent or reservation he may express, together with a brief statement of his reasons. The publication of a volume does not, however, imply that each member of the Board of Directors has read the manuscript and passed upon its validity in every detail.

6. The results of an inquiry shall not be published except with the approval of at least a majority of the entire Board and a two-thirds majority of all those members of the Board who shall have voted on the proposal within the time fixed for the receipt of votes on the publication proposed. The limit shall be forty-five days from the date of the submission of the synopsis and manuscript of the proposed publication unless the Board extends the limit; upon the request of any member the limit may be extended for not more than thirty days.

7. A copy of this resolution shall, unless otherwise determined by the Board, be printed in each copy of every Bureau publication.

(Resolution of October 25, 1926, revised February 6, 1933)

Some Theoretical Problems suggested by

THE MOVEMENTS OF INTEREST RATES,
BOND YIELDS AND STOCK PRICES
IN THE UNITED STATES SINCE 1856

FREDERICK R. MACAULAY



IIPA LIBRARY



NATIONAL BUREAU OF ECONOMIC RESEARCH

NEW YORK · 1938

COPYRIGHT, 1938, BY NATIONAL BUREAU OF ECONOMIC RESEARCH, INC.

1819 BROADWAY, NEW YORK. ALL RIGHTS RESERVED

MANUFACTURED IN THE UNITED STATES OF AMERICA

To
My Friend
WESLEY CLAIR MITCHELL



ACKNOWLEDGMENTS

I wish to thank sincerely Miss E. Gail Benjamin, who aided me in the earlier stages of the statistical work of this book, Miss Celeste Nason, who assisted me later, and Miss Dorothy Achilles, who was in charge of that work as the book went to press. Miss Achilles made most of the calculations and drew all the charts.

To Miss Martha Anderson goes deep appreciation of her careful editorial scrutiny and of the laborious work of seeing the book through the press.

I am grateful to the Metropolitan Life Insurance Company for clerical aid in the collection of bond prices and the calculation of yields. My friend, the late Walter Case, defrayed the expenses of collecting stock prices and constructing the stock price index numbers.

To Dr. Wesley C. Mitchell I am indebted not merely for scientific and scholarly criticism throughout the course of the study, but also for a friendship without which it is literally and exactly true that this book would never have been written.

F. R. M.



PREFACE

THIS book is a striking example of the way in which scientific problems evolve when they are attacked by a thoughtful and thorough investigator.

As Dr. Macaulay explains, he planned at the outset to study the course of interest rates and bond yields in the United States over a long period with a view to ascertaining what statistical relations these rates and yields bear to one another, to the prices of stocks and commodities, to the physical and monetary volume of trade, and to credit and banking activities. One outcome of this plan is the collection of index numbers and time series presented in the Appendix. Men of affairs and students will find in these tables a skillfully and carefully compiled record of past experience that can be put to many practical and scientific uses. No other investigator of interest rates, bond yields and security prices has made so thorough an examination of the surviving data about past transactions in American financial markets, or prepared such trustworthy measures of the various types of fluctuation that these rates, yields and prices have undergone.

This part of Dr. Macaulay's work goes far beyond the task of making a faithful compilation of scattered data. Not only did he make critical use of his sources, such as we expect of a classical scholar who is trying to establish a sound text, but he also observed characteristics of his materials that had received little or no attention. The effort to see clearly what was dimly visible in the original data led him both to extend his collections and to invent ingenious methods of measuring the characteristics that he had found.

While he was studying the behavior of his series relating to bond yields, interest rates, stock prices, commodity prices, bank clearings, and pig iron production, Dr. Macaulay tested numerous hypotheses concerning the interrelations among their movements. Though he found that most of the relations that have been announced by others failed conspicuously over the long periods covered by his data, he also found that

some rules of thumb hold good most of the time. But the more he wrestled with these problems, the more critical he became of purely empirical relations, and the more desirous of finding out why his different series behave as they do.

This striving for rational understanding of his statistical results carried Dr. Macaulay back to antecedent questions concerning the basic characteristics of the several classes of objects he was observing. He had to ask himself a series of fundamental questions about things that we usually take for granted. What are bond 'yields', interest rates, shares in corporations? For what purposes do men want bonds, loans, shares, commodities, gold, money? Why do they make investments for different terms at different rates? What is the 'duration' of a loan?

These questions and their congeners involved a consideration of the economic planning in which men are more or less consciously engaged. One factor appeared to be involved in all plans. Virtually every present transaction into which men enter involves the future—a future that may belong to the 'specious present' or that may be far removed. In few transactions is this element more prominent than in buying bonds or lending money. To understand the behavior of bond yields and interest rates it is necessary to take account of futurity—a factor that constitutes one of the leading differences between the natural and the social sciences, because it does not complicate the explanation of physico-chemical phenomena but does dominate the planning of men and so must be considered in explaining human behavior. In his *Institutional Economics* Professor John R. Commons has recently directed the attention of economists to the role played by the future in men's transactions with one another; but Dr. Macaulay brings more definite data to the treatment of the theme and carries the analysis further.

Of course the future is always uncertain. Men try to foresee, sometimes spending much systematic effort, often contenting themselves with vague anticipations, accepting what has been as an adumbration of what will be. There has been not a little speculation among economists about such matters as the extent to which forecasts of future price fluctuations influence the present demand for loans. Out of such speculations have been spun theories concerning the relations among the movements of prices, interest rates, investments, volume of credit, and production. By taking the clear test case of bond yields and short term interest rates, both considered with reference to the same period, Dr. Macaulay is able first

to demonstrate what the mathematical relationship between the two sets of movements would be if men forecast the future correctly, and second to demonstrate that the actual relationships are commonly of an opposite sort. Though the theoretical relations that would exist between other paired series if the future were accurately known are less simple in their logic, he is able to show how dubious are numerous explanations of the actual relations that credit men with greater ability to foresee the future than they possess.

This discussion of the role played by the future in economic behavior grows out of Dr. Macaulay's efforts to solve the problems attacked in the latter part of his book. Coming later in time so far as the progress of his thinking is concerned, it comes earlier in logical order and is properly placed in Chapter I. Readers interested only in the historical facts concerning interest rates or security prices may not at first grasp the relevance of this philosophical analysis, penetrating as they may admit it to be. But if they follow the argument as it unfolds, their thinking will evolve as Dr. Macaulay's did, and they will see that the book is 'all of one piece'. The beginning really prepares for and illuminates the end.

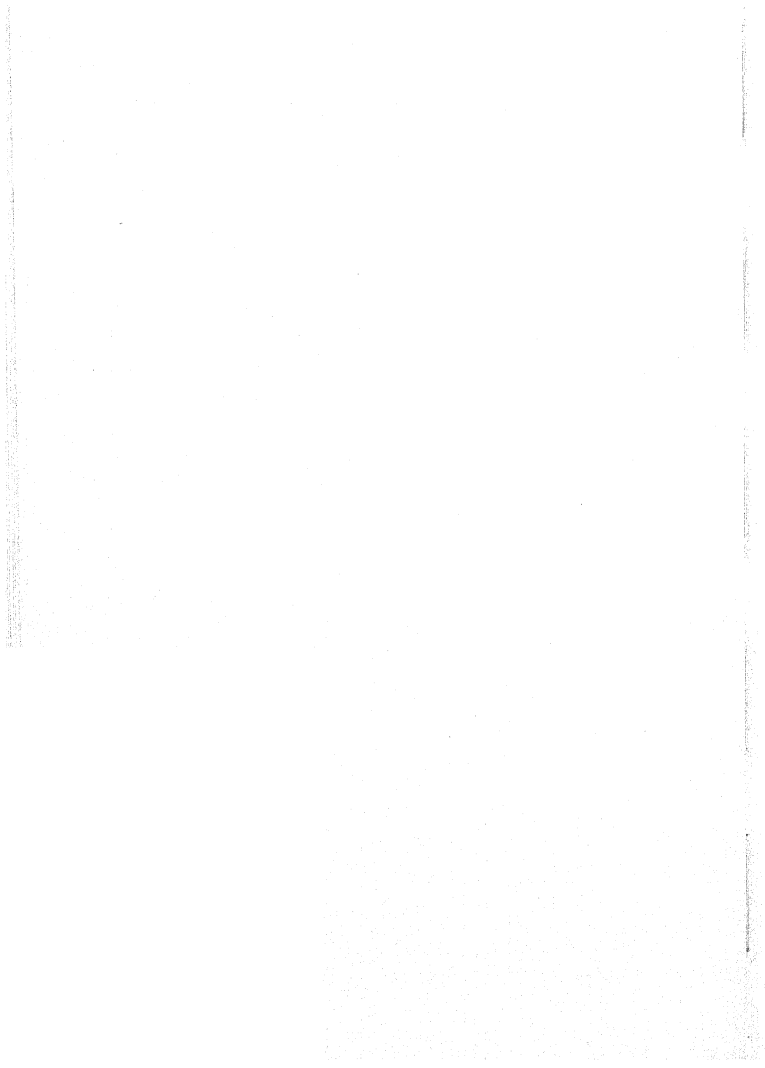
But the end of the book is not the end of the investigation. For, much as Dr. Macaulay has contributed to our understanding of the behavior of bond yields, interest rates, stock prices, commodity prices, clearings and production, and of the interrelations among these variables, his largest service lies in formulating fundamental problems of economics in a way that opens them to attack, in providing better and more abundant data concerning them, in forging tools for analytic use, and showing how to carry the work further. Many a reader will lay down this book longing to enter himself on the enticing tasks that Dr. Macaulay suggests.

WESLEY C. MITCHELL
DIRECTOR OF RESEARCH



CONTENTS

Preface by <i>Wesley C. Mitchell</i>	xi
I Introduction	3
II The Concept of Long Term Interest Rates	24
III Some Theoretical and Practical Difficulties of Comparing Long Term Interest Rates at Different and Especially at Widely Separated Dates	54
IV The Relation of the Movements of Bond Yields to the Grades of the Bonds—Economic 'Drift'	85
V Bond Yields, Economic 'Drift', and the Prices of Common Stocks	128
VI Interest Rates and Commodity Prices	163
VII Factual Leads and Lags and Empirical Forecasting	209
List of Tables	237
List of Charts	239
Appendix	
A Tables (see separate list)	A3
B Professor Irving Fisher's Statistical Measures of 'Price Change'	A311
C The Meaning of Gold Yields of Bonds Payable Principal and Interest in Currency	A327
D Methods for Computing Cyclical and Trend Graduations and Moving Seasonals	A331
E Short Term Interest Rates	A335



Some Theoretical Problems suggested by

THE MOVEMENTS OF INTEREST RATES,

BOND YIELDS AND STOCK PRICES

IN THE UNITED STATES SINCE 1856

"The real trouble with this world of ours is not that it is an unreasonable world, nor even that it is a reasonable one. The commonest kind of trouble is that it is nearly reasonable, but not quite. Life is not an illogicality; yet it is a trap for logicians. It looks just a little more mathematical and regular than it is; its exactitude is obvious, but its inexactitude is hidden; its wildness lies in wait."

—*G. K. Chesterton*

CHAPTER I

INTRODUCTION

THE theoretical and statistical studies contained in this book are an outgrowth of an investigation of the course of interest rates and bond yields in the United States since 1856 and of the statistical relations of those rates and yields to one another, to stock and commodity prices, to the physical and monetary volume of trade, and to credit and banking conditions.¹ Directly or indirectly, the questions discussed are nearly all concerned with the relations of interest rates and security prices to the problem of explaining why we have those recurring periods of prosperity and depression which are commonly termed 'business cycles'.

Throughout the studies, we have emphasized the essentially numerical nature of the interest concept. Instead of stopping with the statement that a rate of interest is a measure of an exchange relation between present money and promised future money payments, we have devoted considerable space to the elucidation of some of the mathematical implications inherent in this particular 'measure'. The usefulness of this procedure is strikingly apparent in the discussion of the relations between long and short term interest rates. The conclusions arrived at with respect to what those relations would be, if men's actions could be and were based on complete knowledge of the pertinent facts and logical use of such knowledge, follow simply and directly from the mere mathematical nature of long and short term rates. Statistical examination reveals that the relations as they actually occur show a definite tendency to run *counter* to these theoretical rationalistic expectations. Now the suggestiveness of such an opposition can hardly be overemphasized. The reflections to which it gives rise inevitably lead to the realization that

¹ The tables and charts concerned with the relations of the rates and yields to credit and banking conditions, with the theoretical and statistical discussion of those aspects of the subject, are to appear in another volume.

the type of economic relationship which it so clearly illustrates must *necessarily* be extremely common. A recognition of this fact is, as we shall see later, of fundamental importance not only to the student of interest rates and the business cycle but also to all who are concerned with the more general subject of the nature and significance of the springs and origins of economic conduct.

Persistent emphasis on the distinction between what actually does occur and what would occur if men knew all that was relevant and acted logically has tended to make many of the answers suggested in this book primarily answers to new questions rather than new answers to old questions. No attempt has been made to solve formally any of the age-old philosophic puzzles which, in economic theory, have been grouped under the general title of 'the interest problem'.

Historically, discussions concerning interest began with queries as to its justification. Was it equitable or was it merely legalized robbery? Whether it should be permitted at all was long one of the most debated subjects in the entire field of economic thought. The question was considered by Aristotle. It engaged the Schoolmen of the Middle Ages in endless wordy argument. With the emergence and development of economics as a separate discipline in the 18th and 19th centuries, the controversy was taken over by the economists. Their treatment of the subject early showed a distinct advance over that of the Schoolmen. They soon sidetracked the *ethical* question of whether interest should be received and given for the more purely *economic* questions of why it is demanded and how it can be paid. The answers to these two related problems, as given by the earlier economists, carried with them an atmosphere of reality which had been totally lacking in the dialectics of the Schoolmen. However, the solutions were in general extremely naive. Indeed, it is impossible to deny that some of the air of reality they possessed was the air of reality that so often resides in that brand of 'common sense' which is eventually discredited by careful scientific analysis. With the gradual development of economic theory the solutions proposed tended to become less and less naive, but not to a corresponding extent more and more scientific. The metaphysical poison of the Middle Ages continued to work in the system of economic thought. Once again, as in the days of the Schoolmen, there arose a tendency to treat the problem as one of logically explaining a set of recognized and simple facts. Seldom was any effort made to enlarge

the horizon of facts to be explained. Usually the struggle was for a neat and internally consistent explanation of the few facts (or assumed facts) that were accepted by all as the counters in the game. Under such circumstances, it is hardly surprising that, even as late as the closing years of the nineteenth century, occasional pauses in the heated discussions between economists, not only as to why interest is and can be paid but even as to how it should be defined, were usually traceable to exhaustion or death rather than to any progress towards agreement.

Within recent years fewer books and articles of a primarily controversial nature have been written on the general problem of why interest exists. No longer is each full-fledged economist supposed to have his own individual and unique 'theory of interest'. Eclectic theories have become popular. It is being stressed that there is truth in most of the theories. Their differences are being explained as the result of concentrating attention too exclusively on particular aspects of the problem. The seeming tendency towards agreement which is thus arising carries with it, however, a strong suggestion of that toleration which commonly appears in the discussion of a problem when either its importance or the possibility of any ultimate solution is no longer considered great. Underlying the collection and attempted welding together of various elements from different interest theories lies the suggestion that immediate further progress is believed improbable if not impossible. The incentive to thresh the old straw over again is waning.

When grappling with the question why interest is paid at all, economists have too generally neglected to ask themselves what use they expected to make of the answer. Like the man who has light-heartedly tackled a picture puzzle, they have too often been primarily interested in solving the problem rather than in using the solution. He looks forward to the moment of triumph when the picture will be completed and he can throw the pieces back into the box. When the economist applies his solution to the actual facts of the market place, he generally does so, not to explain those facts but to prove that they can be explained, not to throw light on them but to show that, when 'properly considered', they do not conflict with his solution. The solution becomes a hobby. When facts clash with it, the facts inevitably give way. A bludgeon that is continually used to overcome any difficulties encountered in applying the theory to specific cases is to deny

that the specific cases are interest rates at all or to 'explain them away' by stating that they involve an interest element and elements of essentially different nature.

Most interest theories attempt to explain 'pure' interest only. However, the nature of 'pure' interest is invariably left quite obscure. It is, of course, almost always that interest for which the theory proposes an explanation, but never do the attempts to define it as 'riskless' interest or in any other direct manner bear up well under critical scrutiny. It is of little use to have an answer to the question 'why interest is paid at all' if the answer does not help us to solve or at least understand those less ultimate but more immediate and direct problems that are concerned with the levels and movements of actual rates.

Economists have gradually come to recognize that the interest problem is essentially a numerical problem and should be approached as such. It is fundamentally a problem of interest *rates*. Any discussion that neglects or under-emphasizes this consideration can hardly be expected to be very fruitful. At best, answers to the question 'why interest is paid at all' tend to be inadequate and incomplete because the question is inadequate and incomplete. It is a non-quantitative, non-numerical question and it consequently leads to non-quantitative, non-numerical answers. Such statements as that interest exists because men naturally value present purchasing power more highly than future purchasing power or that it can be paid because money capital can be used productively by entrepreneurs may or may not be open to the criticism that they beg the question. They certainly require mathematical development before they can be used to handle the quantitative, numerical puzzles that the actual data present. Without such development, they are mere truncated explanations which, even if true, are hardly more than unattached items in the system of economic thought. Of course, one must not expect the rigid exactness of a physical law in a mere economic generalization, but to stop with any such non-numerical explanations as the preceding is almost as if the Newtonian formulation of the theory of gravitation—bodies attract one another with a force that is directly proportional to the product of their masses and inversely proportional to the squares of their distances—were to stop with the words 'bodies attract one another.' Even if perfectly true—which modern astronomers would deny—the 'law', in such an incomplete form and without further development, would be less useful as a key

to the movements of the solar system than the earlier but numerical generalizations of Kepler.

However, any mathematical development of an hypothesis that has inherent weaknesses inevitably brings them to the surface and makes them more apparent. Most theories of why interest is paid at all fail to explain the facts of the actual market not primarily because the theories are non-quantitative but for a more fundamental reason. They commonly assume a degree of rationality and capacity in the conduct of human affairs that does not and cannot exist. Jeremy Bentham's 'pleasure calculus' gave a false picture of the activities of men not merely because their lives are not controlled by the search for happiness but also because they are unable to solve the problems of the pleasure calculus. Too much effort has been expended on trying to 'adjust' the actual phenomena of interest rates to some theory that involves assumptions that are not applicable to the actions of human beings in a real economic environment. Too little effort has been made to discover all relevant facts about actual rates and their behavior, and from those facts to find out, among other things, how human beings really do function.

The interest problem has been prematurely attacked. Too much attention has been paid to solving it, too little attention to formulating it. What do we mean by a rate of interest? What are the essential mathematical characteristics involved in the very concept? What are the quantitative facts about actual rates and why are the facts as they are? How and why do rates vary among themselves at the same time, and how and why do they vary from time to time? How, and with what regularity, are interest rates statistically related to other economic phenomena? What are the most important factors that logically should influence rates? And what are the factors that do influence them? To what extent and under what circumstances do the movements of rates seem consistent with rational human conduct, and to what extent and under what circumstances is explanation hindered rather than helped by assumptions of rigid rationality?

It is a hopeful sign that studies of *rates* have, for some time, been appropriating much of the attention that formerly was given to discussions concerned with the nature of interest as such. Measurement, and reasoning that does not attempt immediately to reach back into ultimates, normally precedes consideration of the nature of the thing itself. It is an old saying that the last thing to be discovered in a

science is what it is all about. However, in the welter of historical records and 'statistical studies', the student of interest rates must not forget that truth does not grow like Topsy. While attempting to avoid the Scylla of fruitless dialectics, he must beware that he is not drawn into the Charybdis of meaningless empiricism. A statistical study that presents nothing but raw facts may sometimes be extremely valuable while one that presents 'correlations', or other evidences of empirical relationships, as though they were explanations, may easily become a delusion and a snare. Something more than the mere presentation of an index number of bond yields, an index number of commodity prices, and a correlation diagram such as that seen in Chart 17 is necessary to disclose the character of the causal relations (if any) that exist between the two series. Such charts and diagrams are, of course, suggestive and important. But, if much progress is to be made, examination of facts must be followed by a serious attempt to understand them, to think the matter through. Mere empiricism will not do. Real explanations come by way of shrewd conjecture followed by adequate testing—the old-fashion road of intelligent hypothesis and rigid verification. However, the road of hypothesis and verification is, in economics, almost necessarily a different and more difficult road to travel than it is in such sciences as astronomy, physics or even biology.

The generalizations of the physical sciences are concerned with the world outside man. The sequence of the seasons, the alternation of day and night, the speed of light, and the relations of oxygen, hydrogen, nitrogen and carbon to animal and vegetable life were as they are before man appeared on the earth. On the other hand, the very essence of economics is that it is a study of human behavior, of the life of man and basically of the *mental* life of man. It takes cognizance of facts in the external world, not for their own sake, but only because of their relations to the mind of man. It is a study of some of the causes and effects of those conscious or unconscious decisions that men inevitably make in their rational or instinctive struggle to 'earn a living' and to satisfy at least some of their desires by adjusting the external world to themselves and—perhaps—thereby securing happiness and well-being. Conditions in the external world of course influence such decisions and are influenced by them but, fundamentally, economics is concerned with mental rather than with physical phenomena, with 'desires' and 'decisions', 'happiness' and 'well-being', rather than with bread and butter

or bricks and mortar. Physical facts or generalizations, even though they be of the greatest economic importance, cannot by themselves constitute economic facts or laws.² Only indirectly is economics interested in the facts of agricultural chemistry or the laws of mechanical engineering, the constitution of bread and butter or the strength of bricks and mortar. It is primarily a study of decisions and not of actions, of how men mentally *compare and measure* the significance for themselves of various actual and possible conditions in the external world and not of how they physically obtain or alter those conditions. It is primarily concerned with the rationale of how men *value* things and not with the technique of how they produce them.

Because economics is a study of the behavior of men, economists will probably never be able to make much use of the concept of *necessity* (or *invariable* sequence) which permeates the physical sciences. Economic 'laws' in the strict sense of the word will probably always be merely statements of more or less pronounced 'tendencies'. Economics is one of the social sciences, and the chain of causation in all the social sciences is necessarily indirect rather than direct, mediate rather than immediate. The mind of man is always the connecting link—and the disturbing element. Large crops do not lead to low prices in the same direct manner in which great distance from the sun is associated with low orbital velocity. Even if it were true that high interest rates were inevitably associated with rising commodity prices, the high rates could hardly be considered a result of the rising prices in the same direct manner that the movements of a dynamo result in an electric current. The manner in which overexpansion of credit may lead to economic convulsions in a community is fundamentally different from the manner in which a large dose of strychnine leads to physical convulsions in an individual.

Furthermore, the peculiar characteristics of the indirect causation

² Though the expression of physical generalizations in economic rather than physical terms may sometimes be highly desirable in order to make their economic importance obvious, it does not alter their essential nature. Economics as such is concerned with how men tend to react to certain physical facts (when known) and not with what those physical facts are. The 'law of diminishing returns in agriculture' may be used as an illustration. That, after a certain stage is reached, successive applications of 'labor and capital' (cultivating and fertilizing, for example) give rise to successively *declining* increments of agricultural produce is primarily a biological and not an economic fact; though, of course, an extremely important biological fact to consider when attempting to understand why men carry on agriculture as they do.

that is seen in economic phenomena do not result from the mere fact that life with its struggle is an essential part of the picture. It is true that life always introduces the element of struggle, the struggle to exist, to 'make a living'. But the struggle with which economics is concerned is always *man's* struggle. It is imaginable that one might work out a system of economics for the beavers or the bees but it would not be the economics we are discussing. It is almost impossible to imagine a system of economics for the oysters or the trees and the flowers. Yet they are all just as much engaged in 'making a living' as is man. It would not be helpful to attempt to define economics in such a manner that the reaching down after water by the roots of a tree could be considered an economic phenomenon. Strictly speaking there is no economic life without man. Man, with the particular type of brain and nervous system that he possesses, is always *the* essential element in the problem.

And right here we encounter the obstacle that will always block the attainment of any such exactitude in economics as is possible in the physical sciences. The minds of men do not admit of the same definite analysis as do the events of the external world. Paradoxical as it may sound, one of the chief differences between the world of matter and the world of mind is that the world of matter is essentially reasonable and the world of mind is not. Reason arose because of its relation to the world of matter. It helps man to conquer his environment. The possibilities of understanding and coping with the external world that the use of reason offers man are almost boundless; its possibilities in the way of understanding and forecasting his own activities are strictly limited. Those activities are partially, though only partially, rational. The presence of a modicum of reason is the disturbing element in the problem which stands in the way of any complete solution by reason.

If men's activities were purely instinctive—a mere matter of tropisms—they could be handled (though of course not by man!) in the way that such facts are handled by the biologist. On the other hand, the implications of the opposite assumption of *complete* knowledge and *absolute* rationality are much more difficult to discuss. Such an assumption must, from its very nature, be so far removed from reality as to make convincing analysis almost impossible. It amounts to assigning to man metaphysical attributes of the same incomprehensible nature as

those that the more philosophic religions commonly assign to deity. On the other hand, one might wonder whether the difficulties involved in analyzing the implications of any such assumption were not primarily the result of its absoluteness rather than of its nature. It might well seem reasonable to think that, *in so far* as men's activities *approached* a condition of complete rationality, *in so far* as they were based on complete knowledge of all that was relevant and rigidly logical use of such knowledge, they might be studied and their significance brought to light and understood by using the methods of the purely dialectic sciences of logic and mathematics—even if the limiting case, in which *absolute* rationality is assumed, presented insuperable philosophic difficulties. It might be thought that, *to the extent* that all men had knowledge of all facts and conditions that had any appreciable bearing on the solution of their economic problems, and *to the extent* that their reactions to those facts were logical rather than emotional, reasoned rather than erratic, economic adjustments by individuals to their environment would occur in the same methodical and mathematically predictable manner as do physical adjustments in the external world.

However, as things are, even those individual adjustments that are deliberately and consciously made show little tendency to be well adapted to the ends in view unless the facts on which action should be based are relatively easily obtainable and the required logical processes fairly simple. Even in the absence of emotion, serious individual maladjustments tend to occur whenever the relevant facts are difficult or impossible to discover or the necessary logical processes are complicated and involved. And only if the factual and logical bases for the individual's economic activities were almost unimaginably perfect, could even *social* economic forecasts be made with anything like the warranted assurance with which astronomical forecasts are now made.

Of course, the disturbing effects that such factors as presence of emotion, lack of logic and insufficiency of knowledge have on the economic behavior of *individuals* would not merit the attention we are giving them if *socially* they always 'canceled out'. If the vagaries of individual conduct were always 'normally' distributed round a strictly rational 'mode', in other words, if the 'deviations' were of the nature of 'accidental' rather than, for example, 'systematic' or 'constant' *errors*, their curbing effects on the development of economics as a strictly logical social science might be small or negligible—unless the 'scatter'

were excessively great. The strictly rational 'mode' could always be discovered by taking a large number of individual observations, and the importance of the 'deviations' of these observations could be expressed in terms of 'probable errors' or other measures of variability. Not merely the 'law', but also the degree of assurance with which the science could be extended by unveiling the logical and mathematical implications of the 'law', could be definitely formulated. The science of statistics has been designed to handle problems of precisely this kind.

It is, however, not worth while attempting to develop in detail the possibilities of such a purely hypothetical condition. It is and always will be thoroughly unreal. *The disturbing social effects of the inadequate solutions that individuals obtain of their particular economic problems result from the fact that many of the inadequate individual solutions do not and never will 'cancel out'.* The reason for this condition lies in a fundamental characteristic of almost all those adjustments that constitute economic behavior. Normally they are adjustments of the present to the future. 'Planning' is the essence of rational economic life and planning looks to the future and not to the past or present. Knowledge of the past or present is normally useful to the 'entrepreneur' or typical 'planner' only in so far as it helps him to forecast and handle the problems of the future. Adequacy of economic adjustments to present conditions is almost always essentially dependent on how adequate is the adjustment to the future. And the existence of such violent social disturbances as are commonly discussed under the general title of 'business cycles' strongly suggests that society at large may well be little, if any, more capable of foreseeing and adjusting to the future than are the individuals of which it is composed. If the existence of business cycles demonstrates anything, it demonstrates that the economic maladjustments of individuals do not always 'cancel out' socially.

Social, as well as purely individual, economic maladjustments tend to increase in severity with an increase in the complexity of an economic system. With the development of large-scale production for the market, the importance of 'planning' becomes increasingly great. With an increasing use of credit, the punishments meted out for inadequate planning (resulting from incorrect forecasting) become increasingly severe. The most elementary form of production is consumer-production—production for one's own consumption. The most important distinction between consumer-production and production for

the market is that, while the consumer-producer needs to forecast only his own desires (and such physical factors as weather) the producer for the market must forecast not merely the desires of other persons but also their (future) ability and willingness to pay a price sufficiently high to give him a satisfactory surplus over his cost of production. He must forecast *demand* and not merely *desire*.

Furthermore, if the consumer-producer, when he comes to the stage of consumption, has changed his mind and wishes that he had applied his work to other ends, there is unlikely to be any serious maladjustment for him or any maladjustment whatever for the community at large. The economic disturbances in a frontier agricultural society in which each farmer is practically self-sustaining are primarily traceable to physical rather than strictly economic origins, to plant or cattle pests or to drought, rather than to price fluctuations. When economic distress occurs in such a community it results from *deficient* and never from *excessive* crops. When Robinson Crusoe planted his corn, the only forecasts he had to make were physical forecasts—that the seeds would germinate and the plants mature. He did not need to consider whether the price per bushel of the resulting corn would be high enough to pay his total costs and still leave him a living surplus. He was free from the dangers of strictly economic disturbances. He did not need to fear that, if the dollars received for the total crop were insufficient to pay the interest on the mortgage on the island, the cannibals would come and throw him into the sea.

Social maladjustments would not tend to increase in severity if the possibilities of adequate forecasting increased rapidly enough to offset the effects of the increasing complexity and intricacy of economic life.³ Such a condition is, however, extremely unlikely to occur sponta-

³ Though the complexity is essentially an economic complexity, its origins are technological as well as purely economic. The fact that in a rural community the construction by the farmers themselves of a system of roads to be communally owned contains no such potentialities of economic disturbance as result from the building of a railroad is explainable by economic and not by technical differences between the system of roads and the railroad. The railroad is producing 'for the market'; the roads are not. The railroad has been financed by means of stocks and bonds whose owners, unless their affairs are to be to a greater or less extent disorganized, must receive their return in cash and not 'in kind'. But it was the technical magnitude and complexity of the railroad that led to its being financed so differently from the roads and producing 'for the market' rather than for its stock and bond holders. In one European country after another, economic crises began to appear sporadically

neously under any economic system containing as large an element of 'laissez-faire' as still exists in the economic systems of such countries as England and the United States.⁴ It is easier to ask questions than to answer them. Under a regime of relatively uncontrolled freedom for individual economic initiative, it is easier to build up a system in which knowledge of the future is of paramount importance than it is to forecast that future. The fundamental problem is one of social control.⁵ It should not be allowed to remain one of mere individual forecasting. However, diagnosis comes before treatment. Before we consider what might be done to reduce the social ill effects of errors in individual forecasting, it is highly desirable that we understand something about the sources of those individual errors that have the most serious social effects—in other words, those errors that socially neither 'cancel out' nor have any other constant relation to a rational norm.

Individual errors in economic forecasting do not usually cause economic disturbances if socially they 'cancel out' or even if the deviation of their social *average* from the rational norm tends to be always of approximately the same *algebraic* magnitude. It is violent fluctuations of the *average*—especially when such fluctuations involve a change of *sign*—that are usually the essentially disturbing elements. So long as men continue to place an extremely high value on diamonds that absurdity introduces no appreciable economic strain. But, if they suddenly came to their senses, the diamond market would collapse. The effects of mass enthusiasm or mass depression are usually of importance to the student of economic fluctuations only because the community is at one time abnormally enthusiastic and at another time abnormally depressed. Even panic is economically destructive primarily because of its unusual and erratic occurrence. If the community at large had, year in and year out, a rather critical and even somewhat (Footnote³ concluded)

soon after the introduction of banking, but they did not begin to take on their modern characteristics until the advent of the industrial revolution.

⁴ Director's Note: "This, while true, does not imply the contrary contention that economic stability would be more certain under rigid forms of social regimentation. The recurring unbalances under complete 'laissez faire' may be less serious than the economic unwisdom of a dictatorship. The path to stability should lie between the two extremes." M. C. Rorty.

⁵ Of course, the control must be both intelligent and stable. The possibilities of accurate long term forecasting are decreased rather than increased by a steady stream of unsound economic legislation, enacted on the theory that the best way to find out whether the effects of passing a bill will be good or bad is to pass it and see.

sceptical attitude towards banks, we should almost certainly have a much better banking system than we have. We must remember that, at the time it occurs, panic may be more logical than not. A general run on the banks may be the result of a belated public realization of the prevalence of grossly incorrect economic forecasting by the bankers, borrowers, depositors, and the community at large. Its explosive and destructive character may be traceable largely to the fact that it did not come sooner.

But erratic emotion is a less fundamentally disturbing influence than either insufficient knowledge or the inability to draw warranted and useful conclusions from what is known. Ignorance is the mother of panic. And, because the most necessary knowledge is knowledge of the future, we must remain largely ignorant. Even such a product of man's own thought as an invention of radical economic importance may burst on an industry like a bombshell.

The future is never certain. But, in all too many instances, thoroughly warranted conclusions as to future *probabilities* are not drawn. The possession of the necessary knowledge of the present, even when such knowledge is easily obtainable, is rare; and the ability to predict, with any great degree of assurance, even the *probable* future from that knowledge is still rarer. The logic we lack, and the logic necessary to handle adequately the more difficult problems of economic life, is more than a mere ability to distinguish the valid from the invalid moods of the syllogism. It is the ability to distinguish the relevant from the irrelevant facts around us and to reason assuredly from such data. However, such reasoning, like the reasoning in all scientific prediction, must obtain its major premises from the particular science involved. But economics, in its present stage of development, may not be prepared to supply the necessary premises. And how few of us have any profound and penetrating understanding of the theoretical and empirical conclusions it is prepared to supply. Lack of knowledge of the future is a fundamentally disturbing factor but the effects of inability to handle logically the facts of the present must not be underestimated. Indeed, if that inability were less, our knowledge of the future would be greater.

The unwise economic conduct of individuals that shows itself in poor forecasting is the major source of social economic disturbances. But it is not the only source. Paradoxically, there is another source in

individually *wise* economic conduct. There is a type of shrewd individual conduct that takes no cognizance of the social repercussions of its actions and that may be almost as socially disturbing in its own field as illogical conduct or conduct based on inadequate knowledge. And we here exclude 'criminal' conduct. When bankers lend increasingly huge sums on stock and bond collateral because, as in 1928 and 1929, rates are high and they feel that such loans are extremely safe, they may be acting, even if unconsciously, not merely in a fundamentally anti-social manner but also in a fundamentally unintelligent manner—in spite of the fact that, from a narrowly individualistic standpoint, any single bank may be economically justified in so increasing its collateral loans. This is an excellent illustration of the specious nature of the doctrine of 'the invisible hand'.

But the difficulties of foresight as compared with 'hindsight' become apparent when we notice the present differences of opinion, among even professional economists of the highest standing, as to the ultimate effects of the purchases of huge amounts of long term Federal bonds by the banks of the country during the past few years.

The effects of the social maladjustments that result from inaccurate forecasting or anti-social behavior on the part of individuals are commonly cumulative. A pressure-momentum develops on the down-side just as an opportunity-momentum had developed on the up-side. Not merely those individuals and institutions that have been guilty of the grossest and most inexcusable miscalculations but also multitudes whose economic activities have been relatively sane and rational are overwhelmed when the unprepared-for future becomes the inescapable present. While the up-momentum has its origin in increased purchasing power, the down-momentum has its origin in decreased purchasing power. The one necessarily involves an element of decision; the other does not. While the up-momentum attains its volume through its hypnotic effects on social behavior, the down-momentum introduces the element of necessity. Few are forced to buy during an upward movement of security prices, many are compelled to sell during a pronounced downward movement. Aesop's fable of the contention between the sun and the wind as to which was the more powerful is not especially enlightening as to what happens when the wind is of tornado force.

What light does this long discussion of some of the essential characteristics of economic life throw on the problems of economic 'hy-

pothesis and verification'? Let us review some of our conclusions. We have seen that economic activities are activities of men in their struggle with their environment. We have seen that the mental characteristics of men are quite as important as the physical characteristics of their environment. We have seen indeed that the physical environment is only one aspect of the total economic environment; that men build up through law and custom an extraphysical environment that, in many ways, affects their economic activities as directly and powerfully as does the purely physical environment. We have seen that most economic activities are peculiarly concerned with the future; that forecasting is of the essence of such activities. But we have seen that the economic future cannot be accurately known and that, though it is conceivable that it could be forecast with a fairly high degree of probability, successful forecasting is now rare. Few men have either the necessary knowledge of the present or the technical equipment and ability to deduce the future from such knowledge.

Because of these facts, we hinted at the possibility of two almost independent systems of economics. The one system would be philosophical, logical, mathematical, and *hypothetical*; the other system would be empirical, statistical, and *actual*. In their most extreme forms, the hypothetical system would be concerned with what would occur if economic activities were logically adjusted to one another and to a real though unknown future, while the empirical system would degenerate into a compilation of unexplained historical and statistical 'precedents'.

There are in existence virtually no illustrations of the extreme form of the first system. But the reason is not that the mathematical economists have felt this presentation of the problem to be too unreal, but that they have not sufficiently appreciated the importance of the fact that economic adjustments to be satisfactory must be adjustments to the future. Illustrations of the second system in its most extreme and absurd form are very common. The 'forecasting' woods are full of them.

In slightly less extreme forms, examples of these two systems have existed side by side since the beginnings of economic thought. But there has been no clear recognition of the extent to which their differences are traceable to the fact that so often they are investigating different things. It has almost always been tacitly assumed that they were investigating the same thing, though in different ways. Strange

consequences have inevitably followed. When methods of investigation that are peculiarly applicable to one of the systems have been applied to the other, more or less uninterpretable results or even complete failures have sometimes appeared; the extent of the failure depending, of course, on the degree to which, in the particular economic phenomena under discussion, what men actually do differs from what they would do if their knowledge were adequate and their actions were rational. The mathematical economist, when he really has been investigating the actions of a non-existent 'economic man', has defended a failure to reproduce the facts of the market place by suggesting that his solution was that to which conditions *tended* and that deviations were merely the result of 'disturbing factors'. The statistician has struggled to formulate a rigidly logical foundation for the 'behavior pattern' that his correlations seemed to suggest. Each has always assumed that there is only one possible economics.

In virtually all discussions of 'method' in economics it has been tacitly assumed that the value of studying what would occur if men acted rationally depends on how closely an analysis of hypothetical rational behavior explains how, in fact, they do act. No one has seriously suggested that one of the chief reasons for studying the economics of a 'rational' society might be because it would, in some respects, be so *unlike* the economics of real life. Yet we have in this chapter come to the conclusion that *erratic social irrationality* constitutes one of the chief reasons for the major economic disturbances of society.

The commendation attached to economic analyses that are primarily based on how men would act if their knowledge were adequate and their reasoning good has been declining for decades. On the other hand, the commendation attached to any study of how men actually do function in economic life has been steadily increasing until a stage has now been reached at which the discovery of statistical 'relations' is almost assumed to be of the greatest possible value whether or not they seem to admit of any significant explanation. One of the chief uses of such studies is naturally in the field of empirical forecasting; if the crop be so large, the most probable price per bushel will be such and such; if a country enters a period of monetary inflation the effects will probably be similar to what they were in such and such a similar instance (if a *really* similar instance can be found); if such and such an economic series has 'turned up' such and such another series will prob-

ably promptly follow, etc., etc. However, we must remember that purely empirical study of how men *seem to have* acted in the past will not *necessarily* solve the problem of how they *will* act in the future. Though it present empirical relationships that may seem as worthy of confidence as did 'Bode's Law' to the astronomers of one hundred years ago, in actual application such relationships and generalizations may, at any time, fail as signally as did that 'law' with the discovery of the planet Neptune. If the variables are related in a clearly causal manner, as for example size of crop and price per bushel, the statistical study of the relationship may be useful not only to the business man and the speculator but also to the economist. It may advance his understanding of both how and why things occur as they do. But if no explanation of why a functional relationship should exist can be supplied by other than a grossly *ad hoc* hypothesis, the 'generalization' may 'work' for years and then fail forever. And, of course, be theoretically quite unfruitful.

While, as we have noted, the 'laws' of a *completely* 'rational' economy cannot be formulated, the relations that would exist under specific instances of accurate forecasting of *particular aspects* of the future are, as illustrated in Chapter II, often easily uncovered. The natural line of approach to such problems is the logical and mathematical. If writers on 'deductive' economics—whether 'mathematical' or non-mathematical—formulated more definitely their underlying assumptions and pointed out more carefully how closely or distantly those assumptions corresponded to conditions as they actually exist, we should almost immediately see a distinct cleavage between studies that are primarily concerned with what *would* occur under specific hypothetical conditions and those that are primarily concerned with what usually does occur. In many problems two distinct 'solutions' would be substituted for an ambiguous single solution. For example, it is inevitable that any reasoning based on the assumption that present conduct tends to be accurately adjusted even to merely particular aspects of the future would often lead to results and solutions far from 'fact'. However, though such results would be recognized as solutions of different problems from those which economists have, in the past, believed they were setting themselves, they would hold their own important position in the scheme of economic thought.

Both types of investigation are desirable. They attack two distinct

aspects of the economic problem. In the effort to reach a complete understanding of the economic activities of mankind, they support each other; but not always in the manner in which they are usually supposed to do. In attacking a particular problem the usefulness of neither is dependent on both giving the same solution. The dual approach to a problem in which the two solutions are different may be as enlightening as in the case of a problem in which the two solutions are approximately the same.

The study of what would occur in a 'rational' economy has, of course, relatively more importance for him who would understand in order that he might change and improve 'the rules of the game' than for him who merely desires to win under the existing rules. Its importance is primarily theoretical and social rather than practical and individualistic. Its appeal is to the legislator and reformer rather than to the entrepreneur and speculator.⁶ In those fields in which forecasting of socially erratic data is attempted, even understandable generalizations will derive their *social* value not merely from the degree of regularity with which they have 'worked' in the past but also from the opportunity which they present to study the effects of the *deviations* of the actual from the strictly rational and to consider the theoretical and actual extent of the economic disturbances to which such deviations may lead.

Though it may well be that, for many problems concerned with economic reform, it is not necessary to know exactly what would occur under specified conditions of 'rationality', it will always be extremely helpful to keep clearly in mind the possible import of that hypothetical question. That the actual is only by accident ever the strictly 'rational' should never be forgotten. That the chief reason for the deviations of the actual from the 'rational' is the inability of human beings to foresee the future, let alone adjust the present to it, immediately suggests a whole group of possible economic reforms. The first has long been recognized. It involves a study of the problem of how to forecast

⁶ However, even the entrepreneur or speculator, if he be well advised, is careful not to stake too much on a generalization whose rationale neither he nor professional economists understands, unless it so regularly and obstinately gives an adequate description of the facts as to compel belief that it must be more than a mere empirical curiosity. Though he may not be interested in how men would act if their knowledge were superhuman and their logic absolute, he may well be somewhat chary of basing actual operations upon an *inductio per enumerationem simplicem* that is anything but free from exceptions.

the future. To the extent that the future can be foreseen it can be prepared for.

It is, of course, highly desirable to learn how things actually have occurred—and particularly how closely or distantly they have followed a 'rational' pattern; to study the problems of economic prediction even into the fields of 'irrational' sequences; to investigate not only the empirical relations between crop sizes and crop prices but also the empirical relations between long and short term interest rates. However, the mere fact that so much effort has already been expended on attempts to improve the quality of empirical forecasting strongly suggests the possibility that no such forecasting will ever be adequate to prevent even such gigantic world-wide economic disturbances as that from which we have but recently emerged.

A more hopeful approach is that of *control*. Instead of attempting to improve the quality of forecasting, we might attempt to make forecasting less necessary. Any economic system functions within a legal pale. Much can be done by mere legal elimination of conditions that make forecasting peculiarly important. However, mere legal restrictions will probably never usher in an economic millennium. If an economic society is to be a highly successful society it should function as a society. We must break away from the mysticism of 'laissez-faire'. Times without number 'the invisible hand' has led mankind into the economic ditch. Positive social action is absolutely necessary. In spite of the inevitable difficulties, the hope of the world lies in truly social, as opposed to merely individualistic, economic *planning*. To the extent that the future can be made, instead of awaited, the disturbing social effects of erroneous and inadequate individual forecasting may become a thing of the past. Of course, adequate public planning is extremely difficult. No system of 'trial and error' will take the place of brains. Without brains, public planning may be extremely dangerous. *We must always remember that the essential objective of public planning should be to make legitimate and desirable private planning easier and not more difficult—unless we are willing to 'go the whole hog' and lapse into a communist state.*

The succeeding chapters of this book suggest a number of ways in which the necessity and importance of particular types of individual forecasting could be reduced by mere prohibitory edict.

Perhaps the most conspicuous is suggested by the light that the irra-

tional relations found to exist between present long and future short term interest rates throws on the indefensible business custom of deliberately using long term bonds as short term investments. It is surely 'looking for trouble' to allow commercial banks to invest any large percentage of their deposits in long term bonds.

Probably the most important element of social economic *control* that the topics discussed in this book will inevitably bring into the reader's mind is the control of the general level of commodity prices. Though it be foreign to our present purposes to delve deeply into the various proposals that have been presented as solutions of that controversial problem, it is certainly not foreign to our purposes to emphasize the social benefits that would accrue from any reduction in the violence of price fluctuations.⁷

One of the most lamentable results of human inability to foresee the economic future is the 'anti-social' forecasting to which it gives rise. In his efforts to foresee what will occur, the individual tends to lose sight of what *logically* would occur. If he is to be personally successful in the speculative aspects of his business life, he must strive to forecast not only those occurrences of the external world that will influence his competitors but also how those competitors will react to such influences—and to their forecasts of how he and others will act. Inevitably he tends to forecast their future actions by means of their immediately preceding actions. In all his speculations he tends to 'follow the trend'. He hesitates to buy on a falling market or sell on a rising one. There is little more limit to his optimism than to his pessimism. When sugar, some years ago, went to twenty-five cents a pound

⁷ Director's Note: "It may be in order to suggest that the only 'control' of commodity prices which is economically sound is indirect control through elimination of the *causes* of violent price fluctuations. Such causes are, in the main, non-monetary in character—in spite of current beliefs to the contrary. Furthermore, even from the standpoint of the believer in monetary control of price levels, it is possible to demonstrate that such control is impracticable and wholly dangerous, if not absolutely impossible, with respect to the *wholesale* prices of basic commodities. Such prices *must* fluctuate individually and in a group, as part of the mechanism of economic balance and adjustment, even though 'costs of living' or other more general price indices are stabilized. The problem of avoiding long term secular changes in price levels must be clearly separated from that of control of short term fluctuations. It is desirable that the latter variations should not be accentuated (as by a vicious circle of credit contraction), but, within the limits required for ordinary economic adjustments, they are desirable rather than undesirable." M. C. Rorty.

at retail, housewives who had never speculated and never owned more than ten or twenty pounds of sugar began to buy it by the barrel.

But let us not end this introductory chapter on such a pessimistic note. Social consciousness and social conscience are growing. It is primarily the intellectual difficulties of the problem that keep us out of the promised land. And with the slowly spreading recognition of this fact a will to conquer these difficulties is arising. Can we not believe, with H. G. Wells, that "a time will come when men will sit with a volume of history or some old newspaper before them, and ask incredulously, 'was there ever such a world?' "

CHAPTER II

THE CONCEPT OF LONG TERM INTEREST RATES

THEORETICALLY, a rate of interest is a measure of an exchange relation between present economic goods and future economic goods of so nearly the same kind as to be, for the purposes of the exchange relation, considered identical. In actual practice, the concept is almost invariably purely monetary. Though interest rates the world over are continually being expressed in terms of the convertible or inconvertible currencies of various countries and in terms of metallic monetary standards such as gold or silver, they are seldom expressed in terms of any such non-monetary commodities as wheat or cotton or even in terms of any 'composite' commodity whose price might be assumed to fluctuate with 'the general level of commodity prices'.

There are two essential elements in the interest concept. To derive any *rate of interest* from a stated set of facts, we must know (1) what is the ratio of the future quantity of money or other good, in which the rate is to be expressed, to the present quantity for which it is being exchanged, and (2) what is the length of time elapsing between the 'present' and 'future' of the particular problem. For example, if a lender gives up a present \$10,000 in exchange for a promised payment of \$11,025 two years from now and if he actually receives the \$11,025 at the expiration of the two years, the rate of interest which he will have received during the two-year period will be $10\frac{1}{4}$ per cent *biennially*, or $10\frac{1}{4}$ per cent *per two-year period*.

If the lender had obtained the \$11,025 at the end of the two-year period by lending \$10,000 for a payment of \$10,500 at the end of the first year, and then lending this \$10,500 for a payment of \$11,025 at the end of the second year, he would be able to say not only that he had realized $10\frac{1}{4}$ per cent *biennially* during the two-year period but also that he had realized 5 per cent *annually* during each of the one-year periods. However, only by assuming that he had obtained the same

rate in each of the two years could he accurately describe the rate during the two-year period of the first case as 5 per cent *per annum*. Unless such an assumption be made, the 5 per cent figure is a mere 'average'. It tells us nothing about the rates which either the lender or the borrower should consider that he had actually realized in the separate years. For example, if the lender could have obtained only 4 per cent per annum for a one-year loan, he must logically consider that he is obtaining more than 5 per cent per annum for the second year. Moreover, this same reasoning applies in its fullness to even such an apparently clear-cut case as that in which a present \$10,000 is exchanged for \$500 payable one year hence and \$10,500 payable at the end of two years. If the lender could have obtained only 4 per cent per annum for a one-year loan, he must think of the \$500 payment as made up of \$400 interest and \$100 payment on the principal sum, and of the \$600 difference between \$10,500 and \$9,900 as one year's interest on a loan of \$9,900. 'Long time interest rates' are always mere 'averages' of short time rates.

At 5 per cent per annum, compounded annually, \$10,000 would, in two years, grow into \$11,025. The \$10,000 is the 'present value' of \$11,025 due two years hence with interest at 5 per cent per annum, compounded annually. The 'present value' of a specified sum of future money, due in a specified time, and upon the assumption of a particular uniform rate of interest until the payment of the future sum and a particular 'compounding period', is such a sum of present money as would grow into the specified future sum, in the specified time, at the specified rate of interest and with the specified 'compounding period'. The concept is purely mathematical. The question whether the assumptions are, in fact, legitimate or absurd has nothing to do with the problem of calculating the 'present value'. If 6 per cent per annum had been assumed as the rate of interest, instead of 5 per cent, the 'present value' of the \$11,025 due two years hence would have been \$9,812.22+ instead of \$10,000. If 100 per cent per annum had been the assumed rate, the 'present value' would have been \$2,756.25 instead of either \$9,812.22+ or \$10,000. Having made these preliminary observations, we are in position to discuss the meaning that must be attached to the 'yield' of a 'bond'.

In the modern economic world the commonest examples of 'long time interest rates' are furnished by the 'yields' of long term 'bonds'.

The typical bond is a promise to make a series of periodic 'interest' payments (usually one every six months) and a payment of a 'principal' sum at 'maturity'.¹ The 'yield' of a bond selling at a specified price is that rate of interest which, if it be assumed in order to obtain the 'present values' of the various future payments, will make the sum of such 'present values' equal the specified price of the bond.

If the reader will examine a 'bond table', he will find that if a 4 per cent \$100 bond, interest payable semi-annually, maturing in $2\frac{1}{2}$ years, sells for \$97.68, it 'yield 5 per cent per annum'. However, since ordinary bond tables give, as the annual yield, *twice the semi-annual yield*, this '5 per cent per annum' means that the yield is $2\frac{1}{2}$ per cent per six months' period, compounded semi-annually.^{1a} But exactly what does this semi-annual yield of $2\frac{1}{2}$ per cent mean? Like most mathematical questions, this may be correctly answered in many ways, but two seem peculiarly enlightening.

The price paid for the bond (\$97.68) equals the sum of the 'present values' of the five \$2 'interest' payments and the \$100 'principal' payment. The 'present value' of the \$2 interest payment due six months hence is $\frac{\$2.00}{1.025}$ or, to the nearest cent, \$1.95. Similarly the present value of the \$2 interest payment due one year hence is $\frac{\$2.00}{(1.025)^2}$, or \$1.90, and the present value of the interest payment due eighteen months hence is $\frac{\$2.00}{(1.025)^3}$, or \$1.86. The present values, to the nearest cent, of the five \$2.00 interest payments are: \$1.95, \$1.90, \$1.86, \$1.81,

¹ The semi-annual payments made to the investor are semi-annual payments and nothing more. To term them 'interest payments' is somewhat misleading, but the terminology is so thoroughly established, and in general so well understood, that to speak of 'dividend payments' or to introduce some other term would probably be more disturbing than to keep to the established usage. Similarly the 'principal' of a bond is universally understood to mean the 'face' of the bond or the amount payable at maturity (excluding the last coupon) and not the amount originally lent or the amount later invested in the bond by any subsequent purchaser.

^{1a} The usual practice of the makers of bond books is to calculate the yields in terms of the 'compounding period' and to assume that the compounding period equals the time between interest payments. This yield is then multiplied by the number of compounding periods in a year and presented as a yield *per annum*. This is a harmless convention—if understood. Of course $2\frac{1}{2}$ per cent compounded semi-annually amounts to $100(1.025^2-1)$ or 5.0625 per cent, and not 5 per cent, compounded annually.

\$1.77. Similarly, the present value of the principal payment of \$100, due in $2\frac{1}{2}$ years, is \$88.39. The total of these six present values is \$97.68, and this is therefore the price paid for the bond.

Another way of looking at the problem, which some persons find even more enlightening, is the following: the buyer pays \$97.68 for the bond. If he is to receive $2\frac{1}{2}$ per cent semi-annually on his investment, there will be owing to him, at the end of six months, $2\frac{1}{2}$ per cent of \$97.68, or \$2.44. However, he accepts \$2 (the 'interest' payment called for by the first 'coupon') and leaves the extra 44 cents with the borrower to draw $2\frac{1}{2}$ per cent semi-annually. The borrower then owes him $\$97.68 + \0.44 , or \$98.12. This now bears interest at $2\frac{1}{2}$ per cent semi-annually. And so forth. The procedure can be clearly shown in a table.

Value of bond at time of purchase (price paid)	\$97.68
Accrued interest ($2\frac{1}{2}$ per cent of 97.68)	+ 2.44
Value of bond just before payment of first coupon	100.12
Payment of second coupon	— 2.00
Value of bond immediately after payment of first coupon	98.12
Accrued interest ($2\frac{1}{2}$ per cent of \$98.12)	+ 2.45
Value of bond just before payment of second coupon	100.57
Payment of second coupon	— 2.00
Value of bond immediately after payment of second coupon	98.57
Accrued interest ($2\frac{1}{2}$ per cent of \$98.57)	+ 2.46
Value of bond just before payment of third coupon	101.03
Payment of third coupon	— 2.00
Value of bond immediately after payment of third coupon	99.03
Accrued interest ($2\frac{1}{2}$ per cent of \$99.03)	+ 2.48
Value of bond just before payment of fourth coupon	101.51
Payment of fourth coupon	— 2.00
Value of bond immediately after payment of fourth coupon	99.51
Accrued interest ($2\frac{1}{2}$ per cent of \$99.51)	+ 2.49

The amount the holder of the bond receives at maturity—\$100.00
principal plus \$2 interest (called for by the fifth coupon) 102.00

From the above illustrations the reader will notice that, though the present value of a distant future payment is of course less than the present value of a near payment, there is, in terms of dollars, only one 'yield' for the bond.² The 'yield' is a *single rate of interest* such that the present value of all the future payments, if they were calculated by assuming this rate (with the *semi-annual* compounding convention), would equal the price paid for the bond. It is a technical mathematical concept.³

In the illustration of the bond maturing in $2\frac{1}{2}$ years, bought at \$97.68 and paying \$2 semi-annually, which we have been using, a naive and simple way of looking at the rate of interest would be to state that for two years the buyer receives 2.047 per cent semi-annually on his investment of \$97.68,^{3a} and then for six months receives 4.422 per cent semi-annually on his investment (still \$97.68).⁴ Finally, at the expiration of the last six months, he also receives the return of his loan, namely \$97.68. Or, using the semi-annual compounding convention of the bond tables, the bond would be thought of as paying 4.094 per cent per annum for two years and then 8.844 per cent per annum for six months. However, neither of these figures is the 'yield' of the bond. The bond has only one yield, namely, 5 per cent per annum. The 'yield' is a species of 'average'.⁵

² Assuming, of course, that the compounding period is stated—as, for example, quarterly, semi-annually, or annually. In our discussion we are assuming semi-annual compounding. See note 1a.

³ It should be noted that the various amounts given in the preceding illustration as "Value of bond immediately after payment of ——— coupon" are prices at which the bond would yield $2\frac{1}{2}$ per cent per annum to maturity. An examination of a table showing the prices at which a 4 per cent bond would yield 5 per cent per annum will show that, for maturities of $2\frac{1}{2}$ years, 2 years, $1\frac{1}{2}$ years, 1 year and $\frac{1}{2}$ year, the prices are \$97.68, \$98.12, \$98.57, \$99.03, \$99.51.

^{3a} \$2 is 2.047+ per cent of \$97.68.

⁴ \$102 — \$97.68 = \$4.32, which is 4.422 per cent of \$97.68.

⁵ The 'yield' per annum of a single payment loan (no 'interest' payments) is a simple function of the geometric averages of the various 'accumulation factors' for the separate compounding periods, whatever those factors or the rates of which they are functions may be assumed to be. For example, if the compounding period be a year, the 'yield' per annum of a single payment loan due in three years and carrying 4 per cent interest the first year, 5 the second, and 6 the third year is $100 (\sqrt[3]{1.04 \times 1.05 \times 1.06} - 1)$ or a shade less than 5 per cent.

On the other hand, the buyer, in making up his own mind as to what he would be willing to pay for the bond, might use, as his *personal* rates of interest, 4 per cent per annum for the first six months, $4\frac{1}{2}$ per cent for the next six months, then 5 per cent, $5\frac{1}{2}$ per cent, and 6 $\frac{1}{10}$ per cent. Using these particular rates he would find that he could afford to pay just \$97.68 for the bond. Four per cent, $4\frac{1}{2}$ per cent, 5 per cent, $5\frac{1}{2}$ per cent and 6 $\frac{1}{10}$ per cent would be the rates of interest that he considered appropriate and that he was using for the successive half-yearly periods, but they would not be the 'yield' of the bond. There would be only one 'yield' to the bond, namely, 5 per cent per annum ($2\frac{1}{2}$ per cent per half-year).

Though we have been emphasizing that there is only one 'yield' to a bond, it does not follow, as we have also suggested above, that because there is only one 'yield' there is only one *rate of interest*. Indeed, there is clear-cut evidence that this is not true. For many economic purposes the 'yield' of a bond must be considered as an *average* of various rates of interest used during successive future periods.⁶

Variations in the 'yield' of loans of the same grade but of different maturities would seem not only to offer conclusive evidence that 'yield' should be thought of as an average, but also to throw some light on the *implicit* interest rates for the successive years. Both municipalities and corporations often offer 'serial' bonds with a large choice of maturity, the various maturities having different 'yields'. For example, on May 15, 1930, the City of Detroit, Michigan, offered to the public \$9,350,000 of $4\frac{1}{4}$ per cent bonds of which not less than \$227,000 matured each May 15 from May 15, 1931 to May 15, 1960. The 'yields' at which the various maturities were offered were: 1931, 3.50 per cent; 1932, 4.00 per cent; 1933, 4.10 per cent; 1934, 4.20 per cent; 1935 to 1960 inclusive, 4.25 per cent.

If the above 'yields' were properly adjusted to the market, and if costs of underwriting are excluded, the City of Detroit could, on May 15, 1930, borrow for one year at 3.50 per cent. Unless the city would have had to pay, on May 15, 1931, more than 4 per cent to borrow (Footnote⁵ concluded)

When there are 'interest payments' the 'average' is of a less simple and unweighted kind than in the case of a single-payment loan. But it is essentially an average.

⁶ The different rates of interest for the successive periods covered by the bond must, of course, be such that they give the same total present value as would be obtained by assuming the uniform rate of interest called the 'yield'.

for *another* year, it would have been cheaper to make two separate successive loans, each running one year, than to borrow for two years at 4 per cent, as the second maturity proposes. Indeed, a little computation will prove that unless the city would have had to pay on May 15, 1931 as high a rate as 4.524 per cent, it would have been as cheap to borrow twice, each time for one year (once on May 15, 1930 at 3.50 per cent, and again on May 15, 1931 at 4.524 per cent), as it was to borrow once for two years at 4 per cent.⁷

If the schedule of 'yields' has any logical foundation it must mean that the Detroit municipal authorities or their banking advisers considered (whether quite consciously or not) 3.50 per cent a 'proper' rate of interest to use during the first year and 4.524 per cent a 'proper' rate to use during the second year. Assuming then these two rates of interest, we may from the 'yield' (4.10 per cent) of the bond maturing in three years (May 15, 1933) discover the implicit rate of interest assumed to be proper the third year. Proceeding in this manner we find that the 'yields' for the successive maturities of these Detroit bonds implicitly involve a set of interest rates for the successive years. These implicit interest rates are 3.500 per cent, 4.524 per cent, 4.311 per cent, 4.529 per cent, 4.475 per cent, 4.247 per cent, 4.250 per cent

⁷ If a $4\frac{3}{4}$ per cent bond having two years to run 'yields' 4 per cent, it sells for \$100.476. How such a bond may just as well be considered as giving a return of 3.50 per cent per annum during the first year and 4.524 per cent per annum during the second year, as 4 per cent per annum during both years, is shown in the following table (the error of one cent on a thousand dollar bond results from dropping decimals):

Price paid for the bond	\$100.476
Accrued interest (1.75 per cent of \$100.476)	1.758
Value of bond just before payment of 1st coupon	102.234
Payment of 1st coupon	2.125
Value of bond immediately after payment of 1st coupon	100.109
Accrued interest (1.75 per cent of \$100.109)	1.752
Value of bond just before payment of 2nd coupon	101.861
Payment of 2nd coupon	2.125
Value of bond immediately after payment of 2nd coupon	99.736
Accrued interest (2.262 per cent of \$99.736)	2.256
Value of bond just before payment of 3d coupon	101.992
Payment of 3d coupon	2.125
Value of bond immediately after payment of 3d coupon	99.867
Accrued interest (2.262 per cent of \$99.867)	2.259
The amount the holder of the bond receives at maturity—\$100.00 principal plus \$2.125 interest called for by the 4th coupon	\$102.126

(for the seventh year and for each succeeding year up to May 15, 1960).

On the same date (May 15, 1930) that the City of Detroit offered to the public the bonds just discussed, the New York Central Railroad Company offered a series of $4\frac{1}{2}$ per cent Equipment Trust Certificates with the same maturities as the Detroit bonds.⁸ The 'yields' at which the various maturities were offered were: 1931, 4.00 per cent; 1932, 4.20 per cent; 1933, 4.35 per cent; 1934, 4.40 per cent; 1935-45 inclusive, 4.50 per cent. The interest rates for the successive years implicit in these 'yields' are: 4.000 per cent, 4.412 per cent, 4.668 per cent, 4.564 per cent, 4.949 per cent, 4.500 per cent (for the sixth year and for each succeeding year up to May 15, 1945). A comparison of these figures with the corresponding figures for the Detroit city bonds shows that the two series are not very similar. While the railroad offers a full one-half per cent per annum more on the one-year notes, its two-year notes yield only one-fifth per cent per annum more than the city's two-year notes. As a result of these facts the implicit rate of discount for the second year is actually *less* for the railroad than for the city. Both the railroad and the city implicit interest series are quite irregular. For example, the city series shows a sharp peak in the second year and the railroad series a sharp peak in the fifth year. For the third year the city series is lower than in either the second or fourth year while the railroad series is higher than in either the second or fourth year. Similarly, the fourth year shows a maximum for the city series and a minimum for the railroad series.

By June 1931 the New York Central Railroad was offering more of this same series of $4\frac{1}{2}$ per cent Equipment Trust Certificates (dated May 15, 1930 and maturing serially May 15, 1932 to May 15, 1945). The 'yields' at which the various maturities were offered, however, were startlingly different from what they had been in May 1930. For the successive maturities the 'yields' were:

YEAR	PER CENT	YEAR	PER CENT	YEAR	PER CENT
1932	2.00	1937	3.625	1942	3.85
1933	3.00	1938	3.70	1943	3.90
1934	3.50	1939	3.70	1944	3.90
1935	3.50	1940	3.70	1945	3.95
1936	3.625	1941	3.80		

⁸ Except that May 15, 1945 is the last maturity of the New York Central bonds, and May 15, 1960 the last maturity of the Detroit bonds.

This series shows irregularities in the implicit interest rates quite similar to those inherent in the two preceding illustrations. For example, the implicit interest rate for the fourth year is much lower than that for either the third or fifth year.

The successive short term interest rates that are implicit in the 'yields' of serial bonds at the issue prices seem only by accident ever to be other than quite erratic. For example, while the mere fact that the future was unknown might explain why the Detroit authorities were willing to pay higher rates than 3.50 per cent on the longer term bonds, if the payment of such higher rates were necessary to complete their financing with the maturities they desired, it can hardly explain the curious ups and downs shown by the sequence of the various implicit short term (annual) rates. Any rational decision as to what should be the 'yields' assigned to the successive maturities in a group of serial bonds logically involves a conscious forecast of successive short term interest rates. It does not seem possible that the erratic short term rates implicit in the Detroit serial bonds (or in either of the two New York Central emissions) were the result of a detailed and definite set of forecasts of future short term rates or even that they were the result of the superimposing of a forecast of the future financial condition of the city (or the railroad) on any reasonable forecast of general market short term rates. In practice, the city authorities probably decided first upon the maturities and the amount to come due on each maturity and then made a rough-and-ready guess of the various 'yields' that would suffice to sell the bonds. We cannot even say that the 'yields' are estimates by the issuing group of the current appraisal of future short term rates by the bond-buying public. The rates themselves offer almost conclusive evidence that no such appraisal is made by either the issuing group or the bond-buying public. The primary reason that implicit short term rates are nearly always *erratic* would seem to be that they are almost never the result of conscious forecasting. Though they are mathematically implicit in the various 'yields' no recognition is given to that fact.⁹

⁹ The reader must not, from the above discussion, assume that we consider 'yield' to be a useless concept. Though it must be thought of as an average, it is an average of which we cannot discover the individual items. The fact that a train makes a 100 mile run at an 'average' speed of 40 miles an hour is a piece of real information even if we know nothing about its speed at various times and places. We have seen that even the 'implicit' rates which may be obtained from the 'yields' of serial

If future rates for the highest grade of six-month obligations were being accurately forecast, a bond of the highest grade would, theoretically, realize in each future half-yearly period between coupons the same return as that carried by six-month obligations at the beginning of the period. The *price* of the bond must fluctuate in such a manner as to attain this objective. If in a tight short term money market in which six-month obligations of the highest grade are selling on a 7 per cent per annum basis, a 4 per cent bond be selling at par, its *price* at the end of the six-month period must have *risen* to \$101.50, if it is to show a return of 7 per cent per annum for the six-month period. This, of course, means a *fall* in the 'yield' during the six months. To preserve the theoretical relationship between present long term and future short term interest rates, the 'yields' of bonds of the highest grade should *fall* during a period in which short term rates are higher than the yields of the bonds and *rise* during a period in which short term rates are lower.¹⁰ Now experience is more nearly the opposite. The forecasting of short term interest rates by long term interest rates is, in general, so bad that the student may well begin to wonder whether, in fact, there really is any attempt to forecast.

However, an examination of the courses of 'time' and 'call' money rates offers almost conclusive evidence that forecasting is really attempted and that at least one reason it is so badly done is that it is so difficult. Both 'time loans' and 'call loans' are loans made to stock brokers with stocks and/or bonds as collateral. The only outstanding

(Footnote ⁹ concluded)

bonds are largely mathematical deductions from economic material which cannot bear the strain of such analysis. Furthermore, even if we knew the forecasts of future short term rates implicit in the 'yield' of a bond, we would, for many purposes, prefer the average. Not only has it the advantage of brevity that is possessed by all averages, but it also has a lack of ambiguity that the individual items could not possess. We must remember that, while the 'yield' is the same for the buyer as for the seller of the bond, the individual estimates of future short term rates may be different for each buyer and seller in the market. Even the implicit rates derived from serial bonds are, at best, only short term rates in the minds of the corporation's officials. We must not forget that any particular maturity may fail to sell, or, if the series is sold as a unit, the prices that later emerge in the open market may be quite different from those of the original issue.

¹⁰ In general, though less accurately, the *prices* should *rise* in periods of high short time interest rates and *fall* in periods of low short time rates. Fall or rise in 'yield' is, of course, not necessarily associated with rise or fall in price. If a bond selling above par is to retain a constant 'yield' it must fall in price continually. In a similar manner a bond selling below par must rise in price.

difference between the two types of loan is the length of time they run. 'Call loans' run 24 hours; 'time loans' run from one to six months. Now, if it were actually known that money placed on 'call' for the next ninety days would yield exactly 6 per cent per annum, no bank or other lender would place money on 'time' for that period at a lower rate than 6 per cent per annum. Generally the lenders would insist upon a little more than 6 per cent to recompense them for having their funds in a less liquid condition. As periods of high call rates are periods of disturbed monetary conditions, this differential would be greater when the next ninety days are to show high call rates than when they are to show low call rates.

In line with these facts, 90-day time loan rates would, theoretically, always be as high as or higher than an *average* (of the type described in note 5) of call rates for the succeeding ninety days. In periods preceding low call rates, 90-day time rates would range only a little higher than the average call rate for the next ninety days but, in periods preceding high call rates, time rates would range appreciably higher than the average call rate for the next ninety days. Moreover, unless the movements of the differential were very erratic, 90-day time rates would, week by week and month by month, show the same ups and downs as the *average* of call loan rates for the next ninety days. Furthermore, as they would move with an average of *future* call loan rates, they would reach maxima and minima distinctly earlier than call loan rates. In general, we would expect 90-day time loan rates to reach maxima and minima about 45 days (or $1\frac{1}{2}$ months) before call loan rates. What are the facts?

In the first place, a comparison of 90-day time loan rates with *averages* of call loan rates for the next ninety days shows that the time rates usually range higher than the call *averages*, as theory would lead us to expect. However, the relation of the magnitudes of the differentials to the levels of the call rates is not what we might anticipate under good forecasting. When the future call averages are low, the time rates almost always range much higher than those averages; when the future call averages are high, the time rates range little if any higher than the averages. When the future call averages are extraordinarily high the time rates are commonly *lower* than the averages. Seldom do the time rates correctly forecast a period of extraordinarily high call rates. Even when they reach as high a maximum as

the call averages, the maximum usually occurs too late to constitute any forecast. Over and over again, in a period immediately preceding high call rates, it was possible to borrow on time and relend on call (during the 'time' period) at a large profit.

An examination of a chart on which are plotted 90-day time money rates and the averages of call money rates for each succeeding ninety days reveals little evidence of good forecasting. When 4- or 6-month time money rates are similarly compared with the proper averages of future call money rates, even less evidence of good forecasting is forthcoming. This applies not only to time money *levels* but also to the timing of movements and the positions of maxima and minima. Time loan rates fail to forecast call loan rates because neither borrowers nor lenders of money on 'time' know much more than nothing at all about the future course of call loan rates.

But this is not the whole story. Before the Federal Reserve system went into operation both call and time loan rates showed pronounced *seasonal* fluctuations. The existence of these seasonal fluctuations was almost universally recognized and their chief characteristics were fairly well known. It was admitted that both call money rates and time money rates contained two elements—a seasonal and a non-seasonal. Under such circumstances, would it not be natural to believe that the poor forecasting of call money rates by time money rates was the result of poor forecasting of the non-seasonal element in the call money rates and to expect that the time money *seasonal* would, upon examination, be found actually to forecast the call money *seasonal*?

At last we have arrived at something that was really known about future short time interest rates, and we find the theory that forecasting is necessarily attempted is at last upheld by the data. The time money *seasonal* shows unmistakable evidences of attempted forecasting of the call money *seasonal*, as may be seen by comparing the monthly seasonal for time money rates (Chart 20¹¹) with a three-month moving average of the monthly seasonal for call money rates.¹² It is true that the lag of the three-month average call money seasonal is usually closer to one month than it is to the one month and a half which the theory would in general demand. However, the essential thing is that there is a distinct lag; the time money seasonal moves *before* the call money seasonal.¹³

¹¹ For the figures see Appendix A, Table 22.

¹² For the figures see Appendix A, Table 21.

¹³ This may be clearly seen from Chart 20 where the two seasonals are presented.

Here we have evidence of definite and relatively successful forecasting. The chief trouble seems to be, not that the time money seasonal does not move early enough, but that it does not move far enough. Its fluctuations are too small. Year after year the fluctuations of the *three-month moving average* of the call money monthly seasonal are greater than the fluctuations of the time money monthly seasonal. The borrowers and lenders of time money seemed loath to adjust their rates completely to what they knew of the call money seasonal. This is somewhat strange because profits could have been made by those who noticed the discrepancy. Before the Federal Reserve system went into effect stock brokers should have borrowed more heavily on call for the first eight months of the year and more heavily on time for the last four months of the year.

If, from call and time loan rates we eliminate the seasonal fluctuations, and then compare the two resulting series, we find the forecasting even worse than for the two original, unadjusted series. Bankers and brokers acted as if they knew virtually nothing about future cyclical or other non-seasonal movements of call money rates. They did know something about the *seasonal* fluctuations. What they knew about they were able to forecast, at least approximately; what they did not know about they were unable to forecast at all—except by accident.

In much of the preceding discussion of the relations that, theoretically, would exist between long and short term interest rates we have implicitly made one fundamental assumption which in actual practice may or may not be warranted: *the assumption of payment*. In connection with any loan there are always two rates of interest which may or may not be the same: first, there is the *promised* or *hypothetical* yield, which can be calculated at the time the loan is made or the bond is purchased, but which may never materialize; second, there is the *realized* or *actual* yield which cannot be known until the last payment has been made. If a 4 per cent bond, maturing in 30 years, be purchased at 90 and held for 22½ years, and if, during that time, forty-five \$2.00 payments be made but no payments of any kind thereafter, the *promised* yield is 4.62 per cent but the *realized* yield is zero per cent. Only on the assumption of absolute certainty of payment is it legitimate to say that the *promised* yield of a bond should logically be an accurate forecast of (completely determined by) the course of

future short term interest rates. In actual practice, a forecast that is quite distinct from any forecast of short term interest rates is introduced into the determination of the *promised* yield—the forecast of the degree of certainty of the future payments. The *realized* yield is not, of course, a forecast at all, as it does not come into existence until after the event.¹⁴

Realized yield concerns the real though unknown future; *promised* yield concerns a hypothetical future which may or may not materialize. It is a mere forecast. However, though the *realized* yield has, in this sense, a reality that the *promised* yield does not possess, it is the *promised* yield that is almost invariably referred to when the word 'yield' is used without designating its meaning. The 'yield' of a bond is the *promised* yield. This fact must never be forgotten. Its recognition clears up many theoretical difficulties.

In calculating the 'yield' of a bond the assumption is made that all future interest payments and the principal payment will be made on the dates specified in the bond. Of course, such an assumption is necessarily absurd in the case of a perpetuity—such as Canadian Pacific debenture 4's or any 'preferred' stock. The chance that all future payments will be made is negligibly small for any extremely long term bond, such as West Shore 4's of 2361. The importance of this condition from a practical standpoint may, of course, easily be overemphasized. If West Shore 4's of 2361 are bought to yield 5 per cent per annum to maturity, the price paid will be \$80.00 for each \$100 face value of the bond. This \$80.00 present payment may be distributed as follows: \$73.23 is paid for the interest payments of the first fifty years, \$6.20 for the interest payments of the next fifty years, and only 57 cents for all succeeding interest payments and the payment of the principal sum—on the assumption of a uniform interest rate of 5 per cent per annum for all future inter-coupon periods.

'Certainty of payment' is for most purposes a purely psychological concept. Only to the extent that it is an opinion in the minds of buyers and sellers can it affect the price of bonds. Security in the opinion of buyers and sellers is commonly spoken of as though it were security in fact. Security *in fact* can be known only when the future has be-

¹⁴ In the light of *promised* and *realized* rates of interest, the concept of 'pure interest' (as a *promised* rate) is seen to be a merely psychological concept. The 'pureness' is necessarily a forecast rather than a fact.

come the past. As the future cannot be known security is always relative; absolute security is a pseudo idea. An actual bond (before maturity) can never be absolutely secure *in fact*. So many buyers and sellers of bonds may *think* of it as absolutely secure that its market price may act as though it were extremely (though not necessarily 'absolutely') secure. In general, the more buyers and sellers who consider a bond to be absolutely secure or nearly so, the lower will be its 'yield'. There is, however, no point at which one can stop and say 'this is absolute security'.

How arbitrary and unreal, from an economic standpoint, may be the mathematically necessary *assumption of payment* is illustrated by the variation in the 'yields' of bonds containing identical promises as to future payments—that is, bonds carrying the same 'coupon rate' and having the same maturity. We immediately realize that, for bonds having the highest 'yields', such 'yields' are merely 'promised' and will probably never be 'realized'. From an economic standpoint they are primarily indexes of lack of confidence in the certainty of the future payments rather than indexes of how those payments would at present be valued—if there were perfect assurance that they would be paid on the promised dates.

The *assumption of payment* (which must be made before the 'yield' can be calculated) is seen to be, in such cases, if not an assumption demonstrably contrary to fact, at least of very dubious validity. 'Promised' yield is not necessarily 'realized' yield.

The concept of 'pure' or 'riskless' interest is metaphysical. The practical contrast is not between 'pure' and 'impure' but between 'promised' or 'expected' and 'actual' or 'realized'. It is quite quixotic to attempt to divide the 'promised' (or even 'realized') return from a bond into 'interest' and 'profits' or something else. Moreover, such a division is unnecessary for either theoretical or historical treatment. Bonds and other interest-bearing obligations may be classified according to their ('promised') yields without introducing the concept of 'pure interest', and the economic significance of such yields may be studied without deciding what the rate of 'riskless' yield would be. All rates of interest are of economic importance. The movements of the yields of second grade bonds sometimes have a much more direct bearing on changes in economic conditions than the movements of the yields of first grade bonds. For example, the yields of bonds of superlative

quality may actually *fall* during a period of great business disturbance and distrust—while the yields of second grade bonds are *rising*. The existence at any time of an abnormally large volume of bonds selling at prices that show extremely high 'yields' is almost certain to be of great economic significance, even though it is not necessarily any evidence that 'long term interest rates as such' are extremely high.

Sometimes distrust of all securities becomes so great that 'investment' deteriorates into 'hoarding'. Many erstwhile investors now demand actual cash, in extreme cases actual specie. Even the highest grade bonds are no longer acceptable. The hoarder demands what he believes to be 'absolute security'. He will accept zero or even negative interest (rent of a safe deposit box). However, such a condition differs only in degree and not in kind from the more commonly occurring flight from the lower grade long term securities into the highest grade short term obligations.

Generally speaking, the relative economic importance of securities of various grades varies with their total market values. If any large proportion of the total market value of securities outstanding in a community is by most persons considered almost absolutely safe, fluctuations in the yield of those securities are, of course, of great economic importance. On the other hand, in a community where there are almost no investments that are generally considered superlatively safe, fluctuations in the yield of such investments are of only academic interest. While movements of the yield of securities considered superlatively safe might be of great importance in a community such as England in the last years of the nineteenth century, it would have little significance in a community such as California in the 1850's. When money in California was commonly lending at 18 to 24 per cent per annum, some few individuals were undoubtedly satisfied to invest in securities yielding them less than 6 per cent per annum. Fluctuations in the yield of such securities were of little economic significance in that community at that time.

The destructive effects of a fall in the prices of bonds are not necessarily dependent on whether the bonds were originally (before the fall) considered high or low grade. The chief reasons that usually make a fall in the prices of high grade bonds more serious than a fall in the prices of low grade bonds are two. In the first place, the total market value of such bonds outstanding (before the fall) is usually

much greater than the total value of the low grade bonds. In the second place, banks usually invest more heavily in high grade bonds than in low grade bonds, and anything that affects the solvency or even liquidity of the banks is always peculiarly serious. In periods when banks are carrying a large volume of low grade bonds, a fall in the prices of those bonds may be almost as serious as a fall in the prices of high grade bonds.

Not only the economic importance of the yield of investments that are considered superlatively safe but also the yield itself is affected by changes in the volume of such securities available. The yields of securities of even as high a grade as United States Liberty Bonds and Treasury Certificates have in the past often been unmistakably responsive to the larger fluctuations in the amount outstanding. This is not, to any appreciable extent, the result of a general belief that certainty of payment is affected more than negligibly by such fluctuations. It merely illustrates the fact that an increase in the volume of even such securities does not automatically create new purchasers—except at lower prices—any more than an increase in the supply of a commodity creates new purchasers—except at lower prices.¹⁵

Furthermore, the volume of investment funds demanding the highest degree of safety is affected by changing opportunities for earnings in less secure investments. The relation of the yield of the highest grade investments to the yield of other investments is always important. Seldom do many persons demand security at any price. Usually, many are willing to take risks with the hope of larger returns than they could obtain from investments that they consider 'absolutely secure'. If the speculative opportunities connected with investments that are believed to have some element of risk seem to increase, the proportion of the investment funds of the country that will demand 'absolute security' will probably decline. The yield of 'absolutely secure' investments will advance. If the opportunities connected with investments recognized as having some element of risk seem to decline or if the risks seem to have increased, the proportion of the investment funds of the country demanding great or 'absolute' security will probably increase.

The evil effects of a pronounced *rise in the yield* of any class of

¹⁵ In spite of partial offsetting by the possibility of 'discounting' at the Federal Reserve banks.

bond are, for some purposes,¹⁶ more easily understood if we speak, as we did a few paragraphs back, in terms of a *fall in price*. For example, the great damage is done by the fall in the *prices of bonds already on the market*, not by the rise in the rates of interest that corporations that wish to engage in new borrowing will have to pay. The effect of the fall in the prices of outstanding obligations is in the present. The effect of the higher yields of the new bonds is in the future. A fall in the prices of bonds actually outstanding immediately affects the financial position of all their holders, while the drain on the resources of a borrowing company, that results from a rise in the rate it must pay on a new issue, will extend over the life of the bond. The first has a concentrated and immediate effect; the effect of the second is spread out thinly over many future years.

A pronounced fall in the price of bonds actually outstanding is serious not only because it destroys present purchasing power, but also because it leads to one of the vicious circles of the business cycle. If the bonds have been used as collateral for loans, that collateral must be increased or a part of the loan must be repaid. If it be repaid by selling some of the bonds, such 'distress selling' tends to lower the price of the bonds just as directly as does the forced selling of any commodity. Contrary to ordinary economic assumptions, things are being sold, not because they are dear, but because they are cheap.¹⁷

From a theoretical standpoint it would seem that major fluctuations in the yields (or prices) of bonds of the highest grade should be relatively more important in periods of prosperity than in periods of de-

¹⁶ In discussing the action of bonds in the business cycle it sometimes seems easier to think in terms of *price* than in terms of *yield*. Why should we not substitute price for yield in all our discussions? Probably the simplest way to answer this question is to point out that 'yield' may often be a better way to measure price than prices themselves. It measures a corrected rather than a raw price. It may be considered as the reciprocal of an adjusted price—a price that has been corrected for varying coupon rates and maturities. Though it is highly desirable to remember the implications involved in 'yield', those implications do not need to frighten us from using the concept. It is not only extremely useful but almost necessary.

¹⁷ This vicious circle is, of course, made still more vicious by those who sell, because they become afraid that prices may go so low that they would eventually be forced to sell—or merely because they believe prices are going lower.

Economists have usually underemphasized the importance of price *movements* as compared with price *levels* in inducing purchases or sales. In the speculative markets, commodities and securities are as often bought because their prices have been going up, or sold because their prices have been going down, as because their prices are low or high.

pression. As bonds of the highest grade are those bonds which are generally so *considered*, there are naturally more of them in periods of prosperity than in periods of depression. A rise in the yield of bonds of the highest grade occurring in the midst of a period of prosperity should be of greater significance than a fall in their yield in a period of depression. Of course this reasoning is somewhat complicated by the fact that a rise in yield (or fall in price) always exerts positive pressure, while the effects of a fall in yield (or rise in price) are largely negative; it creates opportunities rather than necessities or compulsions. An examination of the historical facts strongly supports the thesis that a rise in the yield of interest-bearing obligations of the highest grade—whether they be of long or short maturity—has greater power to terminate a period of prosperity than has a fall in their yields to initiate such a period.

We have seen that, if 'promised' rates were 'realized' and if long term rates accurately forecast short term rates, it would be relatively unimportant to an investor whether he bought long or short term securities. If he bought short term when he really needed long, he would have to be continually reinvesting; and, if he bought long when he needed short, he would have to sell. But both the short and the long term returns 'realized' would be the same whether they were obtained from a succession of short term investments or from a long term investment with possibilities of sale. The price fluctuations of a long term bond would be exactly sufficient to adjust the successive implicit short term rates of the bond to the future rates for future short term loans—no more and no less. The *price* fluctuations of the bond would therefore be unaffected by the interval to maturity. A 4 per cent bond selling at \$90 must rise to \$91.15 in six months if the return is to be 7 per cent per annum for those six months—whether the bond matures in five years or a century.

Of course, bond *prices* do not move this way in the actual market. Not only do they tend to fall rather than rise in periods of short term stringency, but also the more distant their maturity the greater are their *price* fluctuations. The *price* fluctuations of the highest grade bonds maturing in ten years tend to be appreciably greater than the price fluctuations of those maturing in two or three years. But the increase in *price* fluctuation resulting from an increase in time to maturity is not as great as it would be with a constancy of *yield* fluctuation. The

longer the maturity the smaller the yield fluctuations—though, because the *price* fluctuations *increase* with an increase in time to maturity (rather than remain constant), the decrease in extent of fluctuation in yield with lengthening of time to maturity is not nearly so great as it would be if the long term rates accurately forecast the short term rates.¹⁸ The longer the maturity of a bond the greater are the *price* fluctuations, and hence the greater are the fluctuations in the actual short time return realized by buying at the beginning and selling at the end of the short time period. If we define the 'ninety-day yield of a bond' on a particular date as the return that would have been realized if the bond had been bought on that date and sold (without commissions) ninety days later, we find that the 'ninety-day yields' of even the highest grade long term bonds have usually fluctuated much more violently than ninety-day time money rates—usually more violently than even ninety-day averages of call money rates.

An important reason why bond yields (and prices) fluctuate as much as they do is that few buyers of long term bonds buy them with the intention of holding them to maturity. They expect to sell them at some indefinite time in the future. Now to determine what the selling price will be at any particular future date requires something more than even absolute assurance that all interest payments and the principal payment will be met on the dates specified in the bond, and exact knowledge (if it were attainable) of future short time interest rates for the entire life of the bond. The buyer must know what will be the *opinion* of buyers and sellers concerning these matters on that future date—and *whether the potential future buyers will also be not only willing but able to pay*. They can not be forced to buy. Unlike short time loans, long time loans are not 'self liquidating'. Prior to its distant maturity, nobody has to buy or retire a particular long term bond at a particular time or go into bankruptcy. This is why it is so peculiarly inappropriate for banks to place any large percentage of their demand funds in long term bonds.

The fact that long term bonds are bought and sold and not necessarily or even usually held to maturity makes us realize again the artificiality of the concept of security in the case of 'promised' yield. Mere length of time introduces an element of real insecurity in all long

¹⁸ The movements of time and call money rates offer an exception to this generalization. Time money rates have fluctuated *less* than they would have if they had accurately forecast call money rates.

term loans. Only short term loans can be even imagined to be 'absolutely secure'. Who can make even a good guess as to what a particular long term bond will be selling for two years from now? Yet such a guess is an essential element of the 'security' of any short term loan that is to be made by buying the long term bond now and selling it two years hence.

We have, so far in this chapter, been discussing the subject of long time interest rates without asking the question: how much longer term is one loan than another? For a study of the relations between long and short time interest rates, it would seem highly desirable to have some adequate measure of 'longness'. Let us use the word 'duration' to signify the essence of the time element in a loan. If one loan is essentially a longer term loan than another we shall speak of it as having greater 'duration'.

Now the promise contained in a loan is either a promise to make one and only one future payment or a promise to make more than one future payment. If two loans are made at the same rate of interest, and if each loan involves a promise to make one future payment only, the loan whose future payment is to be made earlier is clearly a shorter term loan than the other. For example, if \$100 be lent for one year at 5 per cent per annum, the only payment to be \$105 at the end of the year, and if another \$100 be lent for two years at 5 per cent per annum, the only payment to be \$110.25 at the end of the two years, the first loan is clearly a shorter term loan than the second. If, on the other hand, either or both loans involve a promise to make more than one future payment, or if the rates of interest ascribed to the two loans are not the same, it may be extremely difficult to decide which is essentially the longer term loan.

It is clear that 'number of years to maturity' is a most inadequate measure of 'duration'. We must remember that the 'maturity' of a loan is the date of the last and final payment only. It tells us nothing about the sizes of any other payments or the dates on which they are to be made. It is clearly only one of the factors determining 'duration'. Sometimes, as in the case of a low coupon, short term bond, it may be overwhelmingly the most important factor. At other times, as in the case of a long term, diminishing annuity, its importance may be so small as to be almost negligible. Because of its nature, length of

time to maturity is not an accurate or even a good measure of 'duration'. 'Duration' is a reality of which 'maturity' is only one factor.

Whether one bond represents an essentially shorter or an essentially longer term loan than another bond depends not only upon the respective 'maturities' of the two bonds but also upon their respective 'coupon rates'—and, under certain circumstances, on their respective 'yields'. Only if maturities, coupon rates and yields are identical can we say, without calculation, that the 'durations' of two bonds are the same.

If two bonds have the same maturity and the same yield but one has a higher coupon rate than the other, the one having the higher coupon rate represents an essentially shorter term loan than the other. For example, if each bond is selling on a 5 per cent basis, a 6 per cent bond maturing in 25 years necessarily represents an essentially shorter term loan than a 4 per cent bond maturing in 25 years. This may easily be seen by comparing a \$400 face value 6 per cent bond maturing in 25 years with a \$500 face value 4 per cent bond maturing in 25 years. On both bonds the total of all future payments, both principal and interest, is \$1,000. But on the 6 per cent bond the payments are \$12 each six months for $24\frac{1}{2}$ years, and then a final payment of \$412, while on the 4 per cent bond the payments are \$10 each six months for $24\frac{1}{2}$ years, and then a final payment of \$510. It is plain that the \$1,000 is being paid earlier on the 6 than on the 4 per cent bond. Though both have the same 'maturity', the 6 per cent bond represents a loan of shorter 'duration' than the 4 per cent bond.

The difference in 'duration' of the two bonds is manifest in their prices. As the payments are made earlier on the 6 per cent bond, its price (if the 'yields' of the two bonds are the same) is necessarily higher. For example, as each bond 'yields' 5 per cent, the price of the \$400 face value 6 per cent bond will be \$456.72, while the price of the \$500 face value 4 per cent bond will be only \$429.10.

We see, then, that if two bonds have the same yield and the same maturity but different coupon rates, the bond having the higher coupon rate represents the loan of shorter 'duration'. Instead of examining in a similar manner the case in which the two bonds have the same coupon rate and the same maturity but different yields, and the case in which they have the same coupon rate and the same yield but different maturities, we shall now consider directly the general problem of how to measure 'duration'. Let us approach this problem by considering

the maturity of a bond as a function of the maturities of the separate loans of which it may be said to consist.

It would seem almost natural to assume that the 'duration' of any loan involving more than one future payment should be some sort of a weighted average of the maturities of the individual loans that correspond to each future payment. Two sets of weights immediately present themselves—the *present* and the *future* values of the various individual loans.

Future value weighting seems clearly inadmissible. It gives absurdly long 'durations'. If \$2,000 be lent at 5 per cent per annum in the form of two loans, one of \$1,000 at 5 per cent per annum¹⁹ payable in one lump sum of \$1,050 at the end of one year, and one of \$1,000 at 5 per cent per annum payable in one lump sum of \$131,501.26 at the end of 100 years, the 'average maturity' or 'duration' of the two loans, if calculated by taking an arithmetic average of the two maturities, using the *present* values as weights, is $50\frac{1}{2}$ years. If the *future* values (\$1,050 and \$131,501.26) be used as weights, the 'average maturity' is found to be more than 99 years.

In this illustration, the *present* values (or amounts lent) were equal. Let us examine a case in which the *future* values are equal. If \$959.98 be lent at 5 per cent per annum in the form of two loans, one of \$952.38 at 5 per cent per annum payable in one lump sum of \$1,000 at the end of one year, and one of \$7.60 at 5 per cent per annum payable in one lump sum of \$1,000 at the end of 100 years, the 'average maturity' or 'duration' of the two loans, if calculated by taking an arithmetic average of the two maturities, using the *present* values (\$952.38 and \$7.60) as weights, is about $21\frac{1}{2}$ months. If the *future* values be used as weights, the average maturity is $50\frac{1}{2}$ years.

How absurd it seems to think of a loan of \$2,000 made up of two loans each of \$1,000, one maturing in one year and one in 100 years, as having a 'duration' of over 99 years. And how absurd to think of a loan of \$1,000 made up of two loans, one of \$952.38 maturing in one year and the other of \$7.60—less than 1 per cent of the larger loan—maturing in 100 years, as having a 'duration' of $50\frac{1}{2}$ years.²⁰

¹⁹ In the present discussions, we have not followed the 'semi-annual compounding' convention. For simplicity of treatment, we have assumed throughout that payments are made *annually* and compounding is done *annually*.

²⁰ If one billion dollars were to be lent as a single payment loan at 5 per cent per annum for one year, and one cent as a single payment loan at 5 per cent per annum

But are not the results obtained by using *present* values as weights also open to criticism? If the 'durations' obtained by using *future* value weighting seem unmistakably too long, does not at least one of the 'durations' obtained from *present* value weighting seem very short?

Moreover, if the average maturity of two equal *future* payments be assumed to be the arithmetic average of the two maturities with the *present* values of the future payments as weights, some seemingly paradoxical results may appear. For example, if the yield be 5 per cent and if the two future payments be \$1 at the end of one year and \$1 at the end of 10 years, the average maturity will be about $4\frac{1}{2}$ years. If the dates of payment be one year and 27 years, the average maturity will be about 6.7 years. But if they be one year and 50 years the average maturity will be only 5.1 years, and if the dates of payment be one year and 100 years the average maturity will be appreciably less than 2 years! In this particular illustration, the average maturity has a maximum when the second payment is made in about 27 years! However, these results do not seem so ridiculous if we remember that, as the date of payment of the second \$1 becomes arithmetically more and more distant, its *present value*, or the amount actually lent, becomes geometrically smaller and smaller. In the limiting case, in which the second \$1 is paid at infinity, the 'average maturity' is one year, but the amount of the loan for which the second dollar is to be paid is zero. The argument for present value weighting seems strong.²¹

(Footnote ²⁰ concluded)

for 520 years, *future* value weighting would give the composite loan a duration of about 260 years.

²¹ The actuaries have proposed and solved a problem that must not be confounded with ours. It is termed the problem "of finding the *equated time* for a number of sums due at different times, or, in other words, the average date at which, on the basis of an agreed rate of interest, all the sums might be paid without theoretical advantage or disadvantage to either party" (British) *Institute of Actuaries Text-Book, Part I*, pp. 24 and 25.

The answer is a date such that, if the *sum* of all the *present* values of the different future payments was compounded to that date at the rate of interest used to obtain those individual present values, it would amount to the sum of all the future payments. This is a neat and symmetrical answer to the problem proposed, and it gives better results in practice than the common method of 'equating time', which is based on *future* weighting, but it seems an unreal answer to an unreal question. It is quite logical in assuming that the present value of the single future payment must equal the present value of the sum of the individual future payments, but it seems to beg the question when it also assumes that the *future* value of the single payment at the date of its payment must equal the sum of the individual

Now, if present value weighting be used, the 'duration' of a bond is an average of the durations of the separate single payment loans into which the bond may be broken up. To calculate this average the duration of each individual single payment loan must be weighted in proportion to the size of the individual loan; in other words, by the ratio of the present value of the individual future payment to the sum of all the present values, which is, of course, the price paid for the bond.²²

Let F = the 'face' value of the bond in dollars, i.e. the 'principal' sum in dollars;

I = the number of dollars paid semi-annually, i.e. the number of dollars called for by one 'coupon';

P = the number of dollars paid for the bond, i.e. the 'price' in dollars;

n = the number of half years the bond has to run, i.e. the number of half years to 'maturity';

R = the semi-annual *rate* of the 'yield', e.g. if the bond is selling to yield 4 per cent per annum, $R = 1.02$ (under the semi-annual convention of the bond tables);

Q = the ratio of the face value of the bond to a coupon payment, i.e., $Q = \frac{F}{I}$;

D = the 'duration' of the bond—in half years;

Then

$$D = \frac{\frac{I}{R} + \frac{2I}{R^2} + \frac{3I}{R^3} + \dots + \frac{nI}{R^n} + \frac{nF}{R^n}}{\frac{I}{R} + \frac{I}{R^2} + \frac{I}{R^3} + \dots + \frac{I}{R^n} + \frac{F}{R^n}}.$$

(Footnote ²¹ concluded)

future payments each taken at its particular date of payment. This assumption overweights the time importance of distant payments.

²² In terms of the symbols of the next paragraph,

$$P = \frac{I}{R} + \frac{I}{R^2} + \frac{I}{R^3} + \dots + \frac{I}{R^n} + \frac{F}{R^n} = \frac{I}{R-1} - \frac{\frac{I}{R-1} - F}{R^n}$$

Summing the terms in the numerator, and in the denominator, of this fraction and substituting QI for F , we find that

$$D = \frac{R}{R-1} - \frac{QR + n(1+Q-QR)}{R^n - 1 - Q + QR}.$$

An examination of this expression for the value of D shows that the larger the value of Q the greater the duration; in other words, the smaller the 'coupon' payments are relatively to the face value of the bond the greater is the duration of the bond. Furthermore, the larger the value of R the smaller the duration. D increases with n , though, if R be greater than $1 + \frac{1}{Q}$, in other words if the bond be selling below par, D reaches a maximum before n reaches infinity, declining gradually thereafter to $\frac{R}{R-1}$, the value reached when n equals infinity.

When $Q = 0$, in other words, when the series of future payments constitutes a mere annuity without any 'principal' payment whatever,

$$D = \frac{R}{R-1} - \frac{n}{R^n - 1}. \text{ When } Q \text{ equals infinity, in other words, if the loan is single payment, } D = n.$$

If $R = 1$, in other words if the 'yield' of the bond be zero,

$$D = \frac{\frac{n^2+n}{2} + nQ \text{ (note 23)}}{n + Q}. \text{ Unity is the limiting value of } D \text{ as } R \text{ approaches infinity.}$$

$$\begin{aligned} & \frac{R}{R-1} - \frac{QR + n(1+Q-QR)}{R^n - 1 - Q + QR} \\ &= \frac{R(R^n - 1 - Q + QR) - (R-1)[QR + n(1+Q-QR)]}{(R-1)(R^n - 1 - Q + QR)} \end{aligned}$$

which, when 1 is substituted for R , takes the indeterminate form of $\frac{0}{0}$. However, the fraction may easily be evaluated by the ordinary methods of the calculus. The first derivative of the numerator divided by the first derivative of the denominator is, if $R = 1$, still indeterminate. However, taking second derivatives, we get

$$\frac{n(n+1)R^{n-1} + 2Q - n(n-1)R^{n-2}}{n(n+1)R^{n-1} + 2Q - n(n-1)R^{n-2}}.$$

Letting $R = 1$ in this expression we obtain the value for D given in the text.

When $n = 1$, $D = 1$. When n equals infinity, as when a bond (such as Canadian Pacific debenture 4's) has no maturity date, $D = \frac{R}{R-1}$.

But, if R be greater than $1 + \frac{1}{Q}$, in other words if the bond be selling below par, D will attain a maximum value before n reaches infinity.²⁴ However, unless R be very large, the value of n making D a maximum will be large and the maximum value of D will be very little greater than the value associated with an infinite value for n .²⁵

A short table presenting the relations between time to maturity and duration, for a 4, a 5, and a 6 per cent bond each selling at par, will illustrate the ordinary characteristics of the duration concept (p. 51).

The concept of 'duration' throws a flood of light on the fluctuations of bond yields in the actual market. Not merely do the yields of long term bonds tend to fluctuate much less violently than the yields of short term bonds or the rates on short term loans, such as are represented by commercial paper, but the relation between maturity and violence of fluctuation in yield is much as we would expect to find it from our analysis of the nature of 'duration'. While there is a great difference between the amplitude of the fluctuations in yield of bonds of

²⁴ The explanation of seeming paradoxes of this type has already been discussed.

²⁵ Equating to zero the derivative of D with respect to n leads to an insoluble equation; but an approximate solution is that, for other than extremely large values of R ,

D will reach a maximum when n is a shade greater than $\frac{R}{R-1} + \frac{QR}{QR-Q-1}$.

For example, if a 4 per cent bond be selling on a 6 per cent basis (3 per cent per half year on the semi-annual compounding convention), $\frac{R}{R-1} + \frac{QR}{QR-Q-1}$ will

equal $134\frac{1}{3}$, and this is approximately the value of n (in half years) that will, in fact, make D a maximum. But this maximum value of D , when n equals $134\frac{1}{3}$, is less than $34\frac{1}{3}$ half years and when n equals infinity D equals $34\frac{1}{3}$ half years, a decline of less than two months in its value.

A higher yield will, of course, give a maximum value for D with a smaller value for n and the difference between the maximum value of D and its value when n equals infinity will be increased. For example, if the 4 per cent bond be selling on an

8 per cent basis, $\frac{R}{R-1} + \frac{QR}{QR-Q-1}$ will equal 78. When D is actually a maxi-

mum, n lies between 78 and 79 half years. The maximum value of D is then slightly less than $27\frac{1}{2}$ half years but the value of D when n equals infinity is only 26 half years, a difference of a little more than half a year.

YEARS TO MATURITY	DURATION IN YEARS ²⁰		
	4 PER CENT BOND	5 PER CENT BOND	6 PER CENT BOND
1	.990	.987	.985
3	2.857	2.823	2.790
6	5.393	5.257	5.126
10	8.339	7.989	7.662
15	11.422	10.727	10.094
25	16.026	14.536	13.254
50	21.970	18.765	16.273
100	25.014	20.353	17.120
Infinity	25.5	20.5	17.167

extremely short maturity and of those having ten years or so to run, and an appreciable difference between the fluctuations in yield of the latter and of bonds having forty-five or fifty years to run, there is virtually no discernible difference between the action of these last bonds and the action of those having a hundred years or more to run.

The concept is, of course, full of theoretical difficulties. It is easy to think of the 'duration' of a bond as increasing while the time to maturity is decreasing, if 'long term interest rates' are declining during the period. It would seem only logical, for the purposes of our problem, to think of time not in terms of years or months but in terms of its relation to the growth of capital. But in all our illustrations we have, for purposes of computation, used as 'yield' the yield of the *individual bond* whose 'duration' we were discussing. This amounts to assuming that 'duration' is lengthened by mere increase of security as well as by a true decrease in the 'preference for present over (assured) future money'.

But this assumption leads us into one of the quagmires of 'pure' interest. Are the promised future payments of a low grade bond really

²⁰ If the interest were payable and compounded annually, instead of semi-annually, the durations would be slightly greater than those given above, the difference increasing with increases in the time to maturity. For infinite maturities they would be one-half year greater, that is 26, 21 and 17 $\frac{3}{4}$ years instead of 25 $\frac{1}{2}$, 20 $\frac{1}{2}$ and 17 1/6 years.

If the ordinary concept of 'equated time' (see note 21) were used to calculate duration, no maximum values would appear. A bond with an infinite maturity like British Consols or Canadian Pacific debenture 4's would have an infinite duration. A 6 per cent bond selling at par and maturing in 10 years would have a duration of 7.95 years (instead of 7.66 as in the text table), if it matured in 25 years its duration would be 15.50 years (instead of 13.25), for 50 years its duration would be 23.45 (instead of 16.27), for 100 years 32.92 (instead of 17.12), and if it matured in 200 years its duration would be 43.39 years instead of less than 17 1/6 years as in the text table.

discounted at higher rates than the promised future payments of a high grade bond, or is the difference in 'yield' traceable not to any difference in rates of discount but to a difference in what is discounted, this being, in the case of an ultra high grade bond, the actually promised payments, but, in the case of a low grade bond, the mathematical 'expectations' that result from multiplying each promised payment by the assumed probability that it will be met? ²⁷

Another difficulty connected with the problem will be merely mentioned. We have made the assumption that the rate of interest for each future six month period is the rate corresponding to the 'yield' of the bond. Now the reader realizes that this assumption may easily be contrary to fact. However, we drew attention, earlier in this chapter, to the insuperable difficulties connected with any attempt to discover the real rates of discount for each half-yearly period in the future. If we knew these future discount rates we might then be able to state that two bonds which, *at different dates*, each had the same number of years to run, the same coupon rate and the same 'yield' had quite different durations.

If, for example, the 'yield' of the earlier bond involved a set of relatively high discount rates for the years of the immediate future and low discount rates for the succeeding years to maturity, while this condition was reversed for the later bond, the earlier bond would have a longer duration than the later bond. Because the coupon rates, yields and maturities are identical, the prices of the two bonds will be the same. In other words, the sum of the present values of the future payments will be the same. Hence that bond in which the earlier payments are relatively heavily discounted, and therefore the 'weights' applicable to the shorter constituent maturities are relatively light, will have a longer duration.

The difficulties connected with the problem of arriving at a completely satisfactory concept of 'duration' are, indeed, extremely great. Any proposed solution almost necessarily involves some paradoxes. We have tried to open the reader's eyes to the existence of the problem. The logical atmosphere in which the analysis has had to be carried on may seem to have been somewhat rarefied at times; but we believe that, if the reader has followed the arguments carefully, he will at least not

²⁷ But see Ch. III, note 8.

accuse the writer of being like the good Puritan knight who, in religious controversy,

“ . . . could raise scruples dark and nice,
And after solve 'em in a trice
As if Divinity had catch'd
The itch, on purpose to be scratch'd.”

CHAPTER III

SOME THEORETICAL AND PRACTICAL DIFFICULTIES OF COMPARING LONG TERM INTEREST RATES AT DIFFERENT AND ESPECIALLY AT WIDELY SEPARATED DATES

A RATE of interest arises out of an exchange of present money for a promise to make one or more future money payments. It is a peculiar inverse function of the price paid for the promise. The promise is personal property—a *chose in action*. It may be bought and sold like any commodity. The problem of comparing the prices—or yields—of such promises at different dates is naturally very similar, in some respects, to the problem of comparing the prices of commodities at different dates. However, because the promise, if it be considered a commodity, is undoubtedly a commodity *sui generis*, the two problems are in some significant ways decidedly different.

Let us first notice an important similarity. Just as there are different commodities, so are there different promises. To talk of *the* price of bonds—or, inversely, of *the* rate of interest—is like talking of *the* commodity price. In any important market at any particular time there are many commodities and many commodity prices, many promises and many rates of interest. And the promises, like the commodities, differ not only as to their nature but also as to their quality. To compare call money rates on the New York Stock Exchange in 1890 with the yield of West Shore 4's in 1936 would be almost as absurd as to compare the price of potatoes in London in the year 1800 with the price of pig tin in the same city in the year 1900. And to compare the yield of a low grade bond at one date with the yield of a high grade bond at another date would be nearly as meaningless. For commodity prices or interest rates at different dates to be significantly

comparable, the prices must be the prices of identical or approximately identical commodities and the rates the returns from identical or approximately identical loans.

But here we strike an important difference between the two problems. It is much easier to decide whether two commodities at different dates are approximately identical than it is to decide whether two loans at different dates are approximately identical, though, even in the commodity price problem, this difficulty is much greater than it at first sight seems to be.

The brute materiality of physical objects tends to obscure the fact that, as economists, we are interested in only certain of their psychic implications. While the feeblest intelligence may grasp that the economic significance of a bond lies in the promise it represents and not in the mere piece of paper, it is not so easy to see that the economic importance of each and every economic good lies in its possibility of satisfying human desires and not in its mere physical presence, and that consequently a particular physical object may have great economic significance at a particular date even though its importance was negligible at an earlier date or will be so at a later date. Even if they were not subject to physical deterioration or change, innumerable manufactured objects would have an economic history more or less like that of a moustache cup, a hoop skirt, a spinning wheel, an hour glass or a prairie schooner. Though the particular physical object be unused and therefore remain physically unchanged, its economic significance (for all other purposes than those of the antiquarian) dribbles away like water out of a leaky pot. Even if a Model T Ford of the vintage of 1916 had been preserved in a vacuum, what would it sell for now? The value attached to particular economic goods changes with the introduction of new means of satisfying desires.

The change with time in the economic significance of physical objects is one of the chief obstacles encountered in the problem of attempting to compare the 'general level' of commodity prices at widely different dates. During the last twenty years there has been a great increase in the comfort and mechanical efficiency of the transportation that the automobile purchaser gets for his dollar. 'Automobile prices' are much lower than they were twenty years ago. But *exactly* how much lower? What can one mean by 'automobile prices'? What commodity can we use in 1936 to compare with a Model T Ford in 1916,

and what can we use in 1916 to compare with any of the standard models of 1936?

An automobile may present a rather extreme illustration of obsolescence, but a similar process goes on with respect to most commodities, and the longer the time elapsed the greater become the difficulties of adequate comparison. To compare the cost of living in Boston in 1938 with its cost in 1838 may not be quite so difficult as to compare the cost of living in a small village in the far north of Canada with the cost of living in a small village in the interior of Brazil, but the sources of at least one of the difficulties are the same. Many of the commodities that are used in the one time or place are quite different from those used in the other time or place. While buggies, candles, spinning wheels and clipper ships may have been important in the economic life of Boston one hundred years ago their present importance in the same city is virtually nil.

In Chapter II we drew attention to the fact that the relative economic importance of a particular type of loan may be much greater in one place than it is in another place at the same time, or at one time than it was at another time in the same place. In this respect the difficulties of comparing interest rates at different dates are somewhat similar to those to which we have just been referring in connection with commodity prices. However, we must now draw the reader's attention to some peculiarities of promises to pay that make interest rate comparisons even more difficult than commodity price comparisons.

Though their relative *economic* importance may change, there are many commodities whose *physical* characteristics are practically the same yesterday, today and forever. A ton of pig iron in 1938 may be physically the same as was a ton of pig iron in 1838. Systems of grading such commodities as wheat, corn or cotton make it possible to quote the prices of virtually the same physical things over long periods. But the problem of grading loans is quite another story.

A loan is not a physical thing. The buyer of a bond does not buy even future money, he buys only a *promise* to make future payments. And that promise may become as unsubstantial as was the grin of the Cheshire cat after the cat itself had vanished. Earnings may disappear and even apparently sound collateral become valueless. The price of a bushel of wheat or a ton of pig iron can be determined in the open market without knowledge of who grew the one or mined the other,

but the value of a bond cannot be even estimated from an analysis of its terms without considering the degree of confidence that should be placed in the promises it contains. The question, what should middling upland spot cotton sell for at the present moment on the New York Cotton Exchange has at least some meaning; but the question, what is a fair price at the present time on the New York Stock Exchange for a 4 per cent bond maturing in twenty years has none. To mean anything the latter question would have to tell us something about the 'grade' of the 4 per cent bond.

But the 'grade' of a bond is the grade of the promise it represents. For the yield of a bond at one date to be as legitimately comparable with the yield of another bond at another date as is the price of a pound of middling upland spot cotton at one date with the price of another pound of middling upland spot cotton at another date, the promise represented by the one bond at the one date should be the same or virtually the same as the promise represented by the other bond at the other date not merely with respect to terms¹ but also with respect to *goodness*.

But with respect to what *kind* of 'goodness' should the promises be equivalent? In the first place, it clearly cannot be that essential and intrinsic goodness—or lack of goodness—that a determinist philosopher might say the bond possessed on the date in question but which would not be made apparent until the date of maturity.² For, if we interpret 'goodness' in this manner, we must grade the promises of all bonds that, in fact, made all 'interest' payments and the 'principal' payment on the dates called for in the bonds as *perfect*—exactly one hundred per cent 'good'—during all the time the loans were outstanding. But the possession of this unforeknown and unforeknowable 'perfection' would be a quite fantastic reason for believing in the legitimacy and usefulness of comparing the yield of one such 'perfect' bond at one date with the yield of another such bond at another date. We must remember that the yields of such 'perfect' bonds differ tremendously on the *same* dates. Though two 4 per cent bonds maturing in twenty years may each meet all future obligations on time, the one bond may be selling at the present moment on a 3½ per cent basis and the other on a 6 per cent basis.

¹ For the usual bond, maturity and coupon rate.

² In case of default, perhaps not even then. Cf. Aristotle, *De Interpretatione*, Ch. 9.

In grading bonds at any particular date, we are concerned with how good the bonds *were*, not with how good they *turned out to be*. It is, of course, true that, in a metaphysical sense, how good they turned out to be was how good they really were. But prices and yields can be *directly* affected only by *forecasts* of the future, never by the *facts* of the future. It is, therefore, to forecasts that we must restrict our concept of goodness. It is true that to grade bonds on any basis of how good they *seemed* to be, or even *should* have seemed to be, is to lean upon a flimsy reed. But there clearly is nothing else to do.

Having come to this conclusion, we are faced with the question, should the grading be based on actual or on ideal forecasting, on how good the bonds seemed to be or on how good they *should* have seemed to be. At once we notice that any 'should have seemed' grading is tarred with the same stick as grading based on what the future eventually revealed. It is almost always clear, *after the event*, that, though the future was essentially unknowable, a more shrewd and intelligent analysis of the facts that *were* available should have prevented much of the bad forecasting that actually occurred.

And this difficulty cannot be overcome by arbitrarily limiting the range of facts upon which forecasts 'should have' been based. The essential element in any 'should have' system of grading must clearly be that no pertinent and important consideration shall be neglected. To assume, for example, that, for purposes of yield comparisons, bonds can be more correctly graded by some simple mathematical formula whose variables are all derivable from either present or past financial reports of the debtor corporation than they are in fact graded in the open market is to exhibit an optimism that is difficult if not impossible to defend.

The most intelligent bond buyers are of course interested in how their bonds are 'rated' by the better statistical services, but they desire and obtain more information than is yielded by the symbols AA or B1+. Some years ago the executives of a large statistical organization, which had for years been publishing bond 'ratings', finally came to believe so strongly in the reliability of their own ratings that they initiated a 'switching' service for bond owners. The theory upon which the service was based was that, if a client owned bonds that were selling on a definitely *lower* yield basis than the average yield of bonds of the same 'rating', he should sell them and 'switch' into bonds of the

same rating but selling on a *higher* yield basis. The 'service' was soon abandoned.

But, even if the difficulty of deciding how the bonds *should* have been graded were much less than it is, the question would still have to be answered, is this the kind of grading demanded by the problem? When comparisons of even commodity prices at different dates are being made, is not the relevancy of the prices dependent on what the buyers and sellers *thought* they were exchanging rather than on what they actually were buying and selling? Has not the comparative ease of discovering, for so many important commodities, what actually is being bought and sold obscured the fact that this consideration is, after all and paradoxical as it may sound, in some respects of only secondary significance?

Because a seemingly normal and healthy dairy cow that had been sold 'as is' by one farmer to another for one hundred dollars died the following day, the price paid is not described as a price for moribund cattle; though, if the condition of the cow had been apparent at the time of sale, she *should* have been priced on the basis of 'hide and tallow'.³ If, before the Cripple Creek strike in Colorado, the land on which the mines were later located had been bought and sold as grazing land, no student of prices would now think of describing the early prices per acre as prices per acre of an extremely rich gold field. If a consignment of eggs were sold at a sheriff's sale, without recourse, and if the buyers had understood and believed that the eggs were at least relatively innocuous, the price would not be describable as a price of 'spots and rots'—even though that was the real status of the consignment.

Bonds vary in quality as much as do eggs; and the history of bond

³ It is, of course, true that unless the farmer wanted the cow in order to supply his own family with milk, he was buying not merely a promise to provide that future commodity but more fundamentally a promise to provide future money income. The purchase of a cow could have turned out to be a poor *investment* not because the cow died but because of a fall in the price of milk. This is, however, completely outside the realm of ordinary commodity price history. The student of the history of commodity prices can and does brush such considerations aside. He presents a table showing dairy cattle prices at different dates without discussing whether the purchasers did or did not act wisely. He is recounting the prices of an economic good that is also a physical object and his definition is in terms of physical characteristics. His is a history of the prices of physical objects as those prices were made by people who believed they were buying things having such and such physical characteristics.

prices demonstrates conclusively that, unlike eggs, bonds are *usually* graded very incorrectly by the market—and the statisticians. Collapse of the credit of a corporation is seldom seen far in advance; on the other hand, innumerable bonds that pay on time all coupons and the face of the bond are graded low throughout their existence. This is, of course, exactly what might be expected. As the future cannot be known, bonds must be graded on a probability basis and, unless they are of an ultra-superior quality, the information available for grading them on such a basis is almost always quite inadequate.

And, though the market's rating must be considered as of a probability type, it undoubtedly is not arrived at by conscious mathematical calculations. Indeed, the attempt to make any definite and simple mathematical assumptions as to the elements of the probabilities involved easily leads to conclusions that run counter to what is commonly assumed to be fact—such conclusions, for example, as that the yields of low grade, high yield bonds should be expected to fluctuate *less* than the yields of high grade, low yield bonds. And the attempt to formulate mathematical assumptions whose development will not lead to results that conflict with facts or apparent facts all too easily leads to obviously *ad hoc* hypotheses.

The simplest of all probability hypotheses is that the probability of payment of each and every promised future payment is always the same, $\frac{9}{10}$, for example. With this assumption, the *price* of the bond would, on any specified date, be 90 per cent ⁴ of the price on the same date of a bond containing an identical set of promises but rated by the market as 'absolutely secure'. However, unless the bonds were perpetuities, the *yield* of the lower grade bond would fluctuate less than the yield of the 'absolutely secure' bond.⁵

Such an assumption as that the probabilities of payment are all equal is, of course, quite fanciful. It assumes that the successive probabilities

⁴ Less in a community that did not care for gambling and possibly more in one that did.

⁵ The lower the yield of a particular bond the greater percentage effect on its yield has a specified percentage change in its price. For example, if a 4 per cent bond maturing in eighteen years falls five per cent in price, from 100 to 95, its yield will increase ten and one quarter per cent (from 4.00 per cent to 4.41 per cent); but if it falls five per cent in price, from 120 to 114, its yield will increase fifteen per cent (from 2.60 per cent to 2.99 per cent).

are completely independent of one another and that the question whether a particular payment will or will not be met is unrelated to whether the preceding payments have been met.⁶ But similar strange conclusions result from developing much more appealing hypotheses.

The simplest assumption having any appreciable air of reality is that no payment will be met unless all preceding payments have first been met, but that, as soon as one payment has been met, the probability that the next payment will be met is the same as previously had been the probability that the preceding payment would be met. Under this compound assumption, if the probability that the first payment will be met be designated p , the probability (as of the same date) that the second payment will be met will be p^2 , and the probability that the n th payment will be met will be p^n . In these circumstances the functional relationship between the lower grade bond and the 'absolutely secure' bond is not (unless the bonds be perpetuities) simply expressible in terms of *prices*, though it is so expressible in terms of *yields*. On any specified date the $R^{\text{multiplier}}$ of the lower grade bond will equal $\frac{1}{p}$ times the R of the 'absolutely secure' bond.⁸

⁶ Even 'income' bonds are not exceptions. The payment or non-payment of preceding coupons is at least evidence of ability or lack of ability to pay the next coupon.

⁷ R = the *multiplier* corresponding to the yield, e.g., if the bond is on a 4 per cent per annum basis, $R = 1.04$ (per annum). Under the semi-annual convention of the bond tables R would, of course, equal 1.02 (per half-year) (see Ch. II).

⁸ The price of the lower grade bond is obtained by discounting, not its actually promised interest and principal payments, but their mathematical 'expectations' at the yield of the 'absolutely secure' bond. The price of the 'absolutely secure' bond equals

$$\frac{I}{R} + \frac{I}{R^2} + \dots + \frac{I}{R^n} + \frac{100}{R^n}$$

and the price of the lower grade bond equals

$$\frac{I_p}{R} + \frac{I_p}{R^2} + \dots + \frac{I_p}{R^n} + \frac{100 p^n}{R^n}. \text{ But it is immediately apparent that this value}$$

for the price of the lower grade bond is the same as would be obtained by substituting $\frac{R}{p}$ for R in the expression for the price of the 'absolutely secure' bond.

I and n are, by the hypothesis of identical promises, the same in both bonds.

For definitions of I , n , and R see Ch. II.

The reader should note here, in passing, that, if the lower grade bond be assumed to differ from the higher grade bond not in the rates at which the future promises are discounted but in the valuations placed on those promises (the 'expectations'), it

For example if $p = \frac{99}{100}$ and if, on a particular date, the yield of the 'absolutely secure' bond were 2 per cent per half year, the yield of the lower grade bond would be 3-1/33 per cent per half year.⁹ If the yield of the 'secure' bond advanced to 4 per cent per half year, the yield of the lower grade bond would become 5-5/99 per cent per half year—one and two-thirds times instead of double its former rate of 3-1/33 per cent. The yield of the lower grade bond equals a constant term plus a constant multiple of the yield of the 'secure' bond (see note 9). Its percentage fluctuations are therefore *smaller and not larger* than those of the yield of the secure bond.¹⁰

It would, of course, be possible to construct hypotheses with respect to the market's estimates of the probabilities of the various payments being met that would not be inconsistent with the requirement that low grade, high yield bonds should fluctuate in yield much *more* than high grade, low yield bonds. But any such hypothesis would necessarily be a mere mathematical curiosity.

(Footnote⁸ concluded)

will have an *essentially* shorter 'duration', because the size of the 'expectations' would decrease as their distance in the future increased. Now we know that extent of fluctuation in yield with the passage of time is an inverse function of duration. But it is hard to say whether or not we have here any significant clue as to why low grade bonds might tend to fluctuate in yield more than high grade bonds.

⁹ The R of the secure bond equals 1.02 and hence the R of the lower grade bond equals $1.02 \times \frac{100}{99}$ (see note 7). From this result we get 3-1/33 per cent per half year as the yield of the lower grade bond.

In general, if r_1 represent the yield of the 'absolutely secure' bond and r_2 the yield of the lower grade bond, r_2 will equal $100 \frac{(1-p)}{(p)} \frac{r_1}{p}$ or a constant term plus a constant multiple of the yield of the secure bond.

¹⁰ If the yield of the lower grade (higher yield) bond is to fluctuate exactly as the yield of the 'absolutely secure' bond, in other words if $R_2 - 1 = k(R_1 - 1)$, where k is greater than unity, then p , or the probability that each payment will be made if the preceding payment has been made, is such a function of the yields of the two bonds that the larger their yields the smaller is this probability of payment of the lower grade bond. This, of course, amounts to a *fluctuation in grade*.

As we have seen, $p = \frac{R_1}{R_2}$, but, because $R_2 - 1 = k(R_1 - 1)$,

$$\frac{R_1}{R_2} = \frac{1}{k} + \left(\frac{k-1}{k} \right) \frac{1}{R_2} \quad \text{which increases and decreases as } R_2 \text{ (or } R_1, \text{ as } R_2 = 1 - k + kR_1) \text{ does the contrary.}$$

We saw in the preceding chapter that the yield of a bond was demonstrably an average, a complicated type of average it is true, but essentially an average. The assumption that the rates of discount used during successive future periods are identical was there proven quite unwarranted. Though it is for many purposes a convenient and useful fiction, it is always a fiction. We illustrated this fact by bringing to the surface the different rates for different future periods *implicit* but hidden in the yields of serial bonds, and we described and explained how the 'average' that we term the 'yield' of a bond tells us nothing about the rates of interest of which it is an average. We furthermore showed that there is no such custom of conscious and deliberate calculation as would lead to any significant market pronouncement concerning the various rates assigned to the different future periods. Indeed, to assume the existence of any such pronouncement would be almost as unscientific and indefensible as to indulge in a 'pathetic fallacy'.

We find ourselves, therefore, faced with a dilemma. We can be virtually certain that any mathematical hypothesis based on the assumption that the constituents of the yields are consciously considered would not give even an approximately true picture of how the grading is actually done and the yields actually arrived at. But to shut our eyes to the composite nature of the yields would be quite as disastrous.

And to top all, our hypothesis would be designed to fit not known facts but preconceived fancies. For, startling as it may sound, we do not *know* that lower grade bonds actually do fluctuate in yield appreciably more than do higher grade bonds. Indeed, there are strong reasons for suspecting that the excessive fluctuation in the yields of so-called lower grade bonds is primarily an indication of fluctuation in the *grades* assigned by the market to such bonds rather than an indication that violent fluctuations in yield normally accompany low, *but unchanging*, market grading.¹¹

¹¹ Sometimes, though rarely, the long term movements of the yield of a particular bond of not quite the highest grade are, for many years, so nearly the same as the long term movements of the yields of bonds of the very highest grade as to suggest strongly that the grade of the slightly poorer bond has been relatively stable throughout the period. West Shore 4's of 2361 (Bond No. 70) is such a bond. As may be seen from Chart 2, the long term trends of the yields of that bond (see Line C of chart) from 1885 to 1930 showed no permanent drift away from the index of the yields of bonds of the very highest grade (Line B and Line D—which has the same *trend* as Line B). However, as may be seen from the chart, the intermediate

And averaging the yields presents no logical solution of the problem of comparing the yields of second grade bonds at widely separated dates. One who had not examined the data carefully and considered the problem critically might easily think that bond yields should, not merely practically but also theoretically, be much better adapted to the making of index numbers than are commodity prices. Surely, such an one might reason, bonds have a homogeneity that commodities do not possess. They are concerned with the satisfaction of one great and undifferentiated desire—the desire for money in the future, while the different desires that can be satisfied by different commodities are almost as varied and multiform as are human wants.

Is not the difference between a high grade bond and a low grade bond (of approximately the same duration) like the difference between a high grade and a low grade sample of the same commodity rather than like the difference between two disparate commodities? Is it not the difference between high grade raw cotton and low grade raw cotton or between good potatoes and poor potatoes rather than the difference between cotton and potatoes?

And is even a difference between two bonds that results from a great difference in their durations so fundamental as is the difference between the two commodities? Cannot the one bond be substituted for the other in a way that is quite impossible with the commodities? The proceeds received when a short term bond matures may be reinvested; and both short and long term bonds can always be sold. While an investor is holding a bond, is not the type of good he is receiving from it unaffected by the length of time that the loan has still to run?

And surely, if we were to restrict our choice of bonds to those whose durations were long and not too violently different, we could virtually eliminate the effects upon their yields of fluctuations in their grades by averaging the yields. Why not take a hint from students of changes in the general level of commodity prices? Simply select a representative group of bonds and follow them through from month to month and year to year by means of some kind of averaging.

The complete answer to this engaging but artless suggestion is that all the evidence indicates that the variations in the market's grading of individual bonds with the passage of time are of such a nature that

(Footnote ¹¹ concluded)

and cyclical movements of the yields of West Shore 4's were, during all this long period of forty-five years, usually *less* than those of bonds of the very highest grade.

their effects could *not* be eliminated by any ordinary averaging of the yields of the bonds. The variations in grade, at different times, of individual bonds in a group are not of a chance or accidental type, fluttering back and forth about some constant norm but always showing the same relation to and distribution about that norm. Even in the form of averages, there is no stability to the grades. *There is no 'constant norm'*. The average and the whole distribution of grades undoubtedly drift in great secular swings, immense waves, and even up and down with the movements of the business cycle.

Though fluctuations in the yields of bonds that are not of ultra-superior quality, relatively to the yields of bonds of such quality, are not closely enough related to fluctuations in the earnings of the debtor corporations to make grading upon this basis feasible, they are definitely and unmistakably correlated with such fluctuations. And, because the earnings of nearly all corporations tend to rise and fall with the business cycle and, in any particular industry, to move together over long periods of time, the grades that the market assigns to the bonds inevitably tend to drift as a group and to move up and down together. Over nearly all the period covered by the statistics of this study the steady secular decrease in the 'spreads' of the yields demonstrates unmistakably that the lower grade railroad bonds were improving in grade *as a class*. When they were not doing so, they were declining in grade *as a class*.

It is, of course, true that the lack of confidence engendered by a business depression tends to increase the relative demand for bonds of the highest grade and to decrease the relative demand for bonds of lower grades, and it is also true that the absolute volume of bonds of the highest grade declines and the absolute volume of bonds of lower grades increases (as those that were formerly of the highest grade move into lower classes). And it is further true that the distribution of bonds by grades could be of such a type that the pressure of bonds new to the grade would be an inverse function of the grade. And it is hard to say *how much* of the increase in the 'spread' of the yields of a group of bonds of different grades during a pronounced decline in general business may be the result of any such vicious combination of depressing factors. But we must remember that such factors cannot materialize and become operative unless there first occurs a change in grading, and that, therefore, they cannot be held accountable for more

than a part of the increase in 'spread'. Chart 15 suggests strongly that at least their ultra long term effects are quite negligible.

And, finally, it is perhaps worth noting that the makers of even commodity price index numbers do not attempt to eliminate the effects of variations in *grade* by averaging. As far as possible they quote the prices of identical grades from year to year, and when changes in grade become necessary they adjust for them.

Ordinary index numbers of the yields of second grade bonds are to a greater or less extent like index numbers of stock prices, and such index numbers are, in one respect, almost *sui generis*. At least over long periods of time their chief interest lies in the picture they give of *changes in the nature* of the things whose prices are quoted. When the price of aluminum falls from a large number of dollars per pound to a small number of cents no one suggests that the figures indicate that aluminum was in the early days a distinctly different metal from what it was later. But a long-continued and pronounced rise in the price of the common stock of an aluminum producing corporation would usually¹² be accepted as proof that the market believed that the earning power of the corporation had increased—in other words, that there had been a change in the *nature* of the thing that was being bought and sold.¹³

This consideration does not, of course, even suggest that the economist should be uninterested in the movements of the prices and yields of second grade bonds—any more than that he should be uninterested in the movements of stock prices. But it does suggest in the strongest possible manner that he should consider carefully the meaning of such movements and realize the inherent difficulties of deducing conclusions concerning the movements of 'interest rates' from such material. The economic consequences of a collapse in the second grade bond market may be just as serious if it is primarily caused by fears of declining earnings as it would be if it were primarily caused by a rise in the 'preference for present over future goods'. And long term trends in the quality of second grade bonds may be quite as interesting as long

¹² In the absence of some important technical factor such as a radical change in the capitalization of the corporation.

¹³ Of course some of the rise of a stock or second grade bond may result from a decline in the rate at which expected future dividends or interest payments are discounted. The presence of such an influence would usually be shown by a fall in the yields of long term bonds of the very highest grade.

term trends in interest rates as exemplified in the yields of bonds of the highest grade, but it is highly desirable not to confuse the two.

However, if for no other reason than that the problem is presented in a simpler form, the student of interest rates will tend to be primarily concerned with the yields of the very highest grade bonds rather than with the yields of those of lower grade. The difficulty of measuring the market's estimate of the former is distinctly less than of the latter. Though their yields may not properly be described as 'pure interest'—whatever that may be—there are strong reasons for believing that the estimates of their 'probability of payment' undergo no such radical changes as occur with bonds of lower grade. Though individual bonds that have been given the highest possible rating by both the market and the financial statisticians may within a few years fail to pay interest, no such serious variation in grade is found in the market's rating of AAA or A1+ bonds *as such*. Though it may not be the same *nominal* bond, there is always the possibility of using at the later date *some* bond that the market will apparently be rating the same or nearly the same as it rated the earlier bond. This, as we have already seen, is not true of lower grade bonds.

Bonds of the highest grade are bonds than which there are none better. To a very large extent, the market itself tells us which they are. They are, in general, those bonds that have the lowest yields. Yet an index number using each month the yield of the particular bond showing the lowest average yield during that month is not satisfactory, for the movements of the prices and yields of individual bonds of even the highest grade are often influenced by other factors than those affecting such bonds in general. For example, if the market for a particular bond is 'thin', relatively small purchases by a trustee or other insistent purchaser may run the price up beyond what it normally would be. Or again, rumors that the holders of a small 3 per cent issue selling for 85 may be offered par to clear the decks for a reorganization could easily raise the price to a point at which the yield of the bond would have no general economic significance. In Chapter IV we discuss at some length the problem of deciding what is the most representative yield for the very highest grade of bonds in view of the fact that it is inadvisable to trust entirely to the yield of the *individual* bond having the lowest yield.

Although confining one's consideration to bonds of the highest grade

may eliminate most of the difficulties encountered when the attempt is made to use lower grades, it does not remove them all. Rates depend not only on the security or reliability of the promise but also on what is promised. Time is of the essence of the interest problem and we saw in Chapter II that the rates imputable to different intervals of future time are almost never the same. Because of this fact the yields of long and short term bonds of even the highest grade would seldom even theoretically be the same.

And, because all bonds except perpetuities change their 'durations' with the passage of time, mere averaging of the yields of the same *nominal* bonds is open to the same criticism that could be levelled against comparing cattle prices on appreciably different dates by comparing the prices of identical cattle on the appreciably different dates. The age distribution of the cattle should be the same on the two dates but, as they are the *same* cattle, this cannot be true. If they are now each four and a half years old, a comparison with four years previous would give a result entirely different from what it would if they were now all ten or twelve years old. When we compare the prices of cattle at two different dates we do not take the prices of the same cattle. We take the prices of cattle that are not merely approximately the same grade but also of comparable ages. Even bonds of the highest grade are not exempt from this influence. If their maturities be at all close, they change appreciably in 'duration' with the passage of even a short period of time and this change affects definitely the essential nature of the loan.

From a strictly theoretical standpoint, it would seem necessary to find, for each date, bonds of the same coupon rate and maturity. However, the practical investigator will remember that rates depend on 'duration', rather than on 'years to maturity', and that, if the 'duration' of a bond is not too short, increases or decreases of a few years in the 'time to maturity' affect the yield only negligibly. And, of course, yields could (at least theoretically) be corrected by a statistically-derived equation relating yield to duration.¹⁴

¹⁴ Practically, any such correction is dangerous. Because bonds whose quotations are usable for any particular dates are relatively few, and the scatter of their yields and durations is very considerable, it is difficult to discover whether the empirical (as opposed to logical) relationship between yields and durations is even of the same kind at different dates. Moreover, even if it were always the same and even if we knew exactly what it was, the wideness of the scatter of the data from which it was derived would introduce a high degree of probable error into

After security and duration, the theoretically next most interesting factor influencing the yield of bonds is taxation. A strong case can, of course, be made for considering the return from tax-free investments as theoretically a purer index of the 'preference for present over future goods' than is the return from taxed investments. Both types merit study. But they must not be confused or mixed. Under a graduated income tax law, it is impossible to express one as a function of the other without introducing a third variable. And, if the tax-exemption is only partial, as is usual, the complications of use and comparison are still further increased. With the introduction of the income tax into American finance, the whole status of such bonds of course completely changed.

A minor practical difficulty encountered by the economic historian who attempts to use the yields of tax-exempt or partly tax-exempt bonds is that, aside from Federal bonds and a very few municipal and state bonds, the markets have usually been relatively poor, and quotations (because sales were largely 'over the counter') less easy to obtain and less reliable than quotations for bonds of the larger corporations. In the earlier period covered by this study it was often impossible to identify state or municipal bonds from the printed titles in the price sheets. For example, for a number of years there were quotations on the Philadelphia Stock Exchange for 'Penna. 6's', but for most of the period we were unable to discover what particular bonds were being quoted, there being at all times different 6's of various maturities outstanding. Finally, the reader must remember that a tax-exempt municipal bond is not necessarily of higher grade than a corporation bond because it sells on a lower yield basis. Its 'probability of payment' may be very definitely less.

Other factors affecting the yields of bonds are theoretically less intriguing though many are of great practical importance. But their nature is such that their influence can seldom be allowed for.

Changes in yield resulting from changes in the relative importance of a particular bond in the general economy because of changes in its markets or marketability are practically impossible to measure or over-

(Footnote ¹⁴ concluded)

the statistically-determined constants. The artificiality of the resulting theoretical yields would offset any possible increase in their homogeneity.

However, the statistical questions involve interesting problems in multiple correlation and someone may at some time care to follow them further than we have attempted to do.

come. Indefiniteness in the promise itself, such as exists in callable bonds and in bonds payable in two or more currencies at the option of the holder, may under some circumstances not be important; but when it is, it is extremely difficult to correct for, and attempts to do so seem undesirable if bonds with less ambiguous promises are readily available. Convertible bonds and bonds carrying special privileges of any kind, such as 'circulation' privileges, present similar difficulties. The promise to make future money payments is only one of the elements determining their prices and yields. They are mongrels and it is next to impossible to measure the degree of their contamination.

Changes in markets and marketability may have appreciable effects on the yield of a bond. Paradoxical as it may sound, a case may be made for the contention that, if the yield of a bond is to represent a *simon-pure* long-term interest rate, the bond must have no market whatsoever. The purchaser must buy it because he is willing to exchange present money for certain specified future money payments. If the yield is to be an index of *his* preference for present over future money he must buy the bond because it promises to pay him certain sums of future money *on the dates specified in the bond*. If he buys \$100,000 worth of United States Treasury 3's of 1951 with the intention of selling them in five or six months, because he wishes to make a short term investment and calculates that he can obtain a satisfactory return by the transaction, his *personal* valuation of the promises contained in those bonds probably affects little if at all the price he is willing to pay for them. He may own a profitable business and feel certain that, if he is to continue in business, he will, in a few months, need the \$100,000—or whatever he may sell the bonds for. Under such circumstances, he might be unwilling to pay more than thirty or forty thousand dollars for the bonds, if he knew that he could not hypothecate or sell them. The fact that he actually pays par or more has little or no relation to any personal valuation of the promises contained in the bonds. The bonds do not mature for 15 years and the only *personal* comparison that he makes between present and future money is a six-month comparison—nothing more.

Though a corporation may sell a long term bond under conditions that make it illegal for the corporation to retire the issue before maturity, or even to buy individual bonds in the open market, few purchasers—especially if they are individuals or 'natural persons' and not

corporations—would be likely to advance present money if the only good they could obtain in return was the privilege of receiving the interest payments and the principal payment when it became due. Natural persons seldom give to the buying of a bond the same kind of consideration that they give to the purchase of an annuity. The price they pay for the annuity is a real measure of the personal importance that they attach to the promised future payments. They seldom buy long term bonds in any such frame of mind. The marketability of a bond is one of the essential factors that determine its price and yield.

Legal restrictions and even mere custom powerfully affect the markets. As soon as a bond gains entrance to the 'legal' group in which trustees may invest, its price rises. And customs change. Forty years ago the prejudice against 'industrial' bonds was wide spread. The recent collapse of both 'guaranteed' and other real estate mortgages may affect all real estate loans, good, bad and indifferent, for some years to come.

Indefiniteness in the promise itself is sometimes so disturbing as to preclude all possibilities of using yield comparisons as indications of interest rate movements. Though callable bonds may, when selling much below their call price, be apparently unaffected by this element of uncertainty, as they approach that price their yields often begin to lose all significance. If there is any strong feeling in the market that they may actually be called, the yield becomes more or less that of a short term loan whose maturity is the callable date. In any case the yield is affected by a factor that can be neither measured nor corrected for except by comparison with another bond that seems strictly the same in all respects save the callable feature. But why, under such circumstances, use the callable bond at all?

Another illustration of indefiniteness in the promise is seen in bonds that are payable in whichever of several currencies the holder may choose to demand. Though such a clause may have little or no effect on the yields in times when all the currencies referred to in the indenture are rigidly bound together by some such tie as gold convertibility, in times of disturbance and chaos in the foreign exchanges its effect on the prices of the bonds may be so pronounced as to make the yield in any particular currency quite misleading if considered as an interest rate.

As we have already said, bonds granting valuable rights and privi-

leges unrelated to the promise to make future money payments are, for the student of interest rates, mere mongrels. The yields of United States 'circulation' bonds were not, in the years before the Federal Reserve system, interest rates in any simple and direct sense of the term. Convertible bonds selling anywhere near their conversion price act as stocks and not as bonds.

Most of these difficulties are, of course, of greater theoretical than practical importance. When attempting to make really significant comparisons of bond yields at different dates, we can easily refuse to consider mongrel bonds whose prices are affected by other factors than their promises to pay money. We do not need to use convertible bonds. Bonds containing indefinite or uncertain promises can likewise be eliminated. We do not need to use callable bonds—certainly not when their price is anywhere near the call price. The problem of taxable or non-taxable bonds can be solved by deciding how we wish to define yield. When the decision is made, we do not need to mix the two types. Much can be done to obtain bonds whose marketability does not undergo any violent change during the period in which the bonds are used.

Of course, the accuracy of interest rate or bond yield comparisons becomes more and more open to question as the difference in time increases. This is true, even if all possible adjustments are made for changing grade, etc. The yield statistics presented in this volume cover seventy-nine years, and it cannot be denied that it would be extremely difficult to describe the characteristics of a bond of the year 1890, let alone 1857, that would be strictly comparable with any particular bond at the present time. If the credit of the borrowing corporation or municipality is such that its bonds are today generally considered 'absolutely' safe in any but a metaphysical sense, the problem would seem easier. But we must remember that, in 1890 or 1857, bonds of this class may have been relatively more or less scarce, in view of the demand for them, than they are now. The yields of even United States government bonds have, at various times, been unmistakably affected by changes in the volume outstanding. This can only very partially be accounted for by any change in the degree of 'security'. An increase or decrease in the relative volume of even the highest grade bonds outstanding will, in the absence of artificial influences, inevitably affect their yield. Though a technically correct comparison might be made,

the *significance* of their yields would be different at different dates.¹⁵

Over both short and long periods it is easier to obtain an accurate measure of changes in the average yield of the highest grade bonds than it is to obtain an accurate measure of changes in the yield of bonds of any lower grade. The primary reason for this is that we can give at least a rough and ready answer to what we mean by the best bonds. As soon as we leave the relatively secure ground that they are bonds than which there are none better, and that, in general, they are the bonds that have the lowest yields, and discuss bonds of any lower grade we are faced with the problem of defining their grade. The second reason is that the best bonds do not change grade in any such free and easy manner as do other bonds. Their yields are but little affected by the changing fortunes of individual corporations or even by the changing fortunes of an industry as a whole.

If the earnings of a corporation cover the interest charges on a bond thirty times, the market takes little or no notice of a change in conditions such that the charges are covered only twenty times. On the other hand, a change from one and a half times to once only will probably be considered extremely serious. The yield may rise violently. The lower the grade of a bond the more it tends to act like a common stock. It comes to be significantly affected not only by interest rate factors but also by potential earnings. Whether the yields of the highest grade bonds are, at any particular time, of more or less economic importance than the yields of bonds of some specific lower grade, their meaning is simpler and their values are easier to obtain.

Until the World War there was a rather pronounced tendency for the movements of the yields of the highest grade bonds in the different financial centers of the world to become more and more alike. However, this similarity was almost non-existent in the earliest period covered by our statistical studies and was only irregularly noticeable after the disturbances to the various monetary bases that came during the War. The interest rates and bond yields presented in this volume are all from the eastern financial centers of the United States, indeed, chiefly from New York City.

For the study of long term as opposed to short term rates, primary

¹⁵ Comparisons of recent and early figures for even call money rates or commercial paper rates are properly subject to considerable questioning. There seems little doubt that the security of each of these classes of loans was much less in the earlier period,

reliance has been, aside from the last few years, placed on the yields of American railroad bonds. Index numbers based on the yields of municipal bonds or bonds of corporations other than railroads have been introduced only for the sake of checks and comparisons. Such a procedure may seem to need some defense. The reader, especially if he is not an American, may wonder why, if we were primarily interested in the highest grade bonds, we did not use United States government bonds. The sufficient reason is that, during most of the period covered by this study, their yields were seriously affected by their circulation privileges. The bonds were intimately tied up with the whole structure of the national banking system. American 'National Banks' were allowed to issue 'National Bank Notes' based on United States government bonds that they had deposited with the Comptroller of the Currency. Consequently the bonds were bought for two reasons: first, because of the interest they paid; second because they could be used as collateral for the issuance of currency. The yields were naturally much lower than if the bonds had been valued for their interest payments alone.

It might be thought that, since the formation of the Federal Reserve system, the yields of Liberty and Treasury Bonds could be considered an adequate index of long time interest rates in the United States. However, it must not be forgotten that they also carry special banking privileges, such as eligibility for use as collateral with the Federal Reserve banks at par. Finally, the investigator who might consider using them is faced with the practical difficulty that the yields of most of them are ambiguous. The maturity dates are not fixed. They are callable bonds.

We have used index numbers based on the yield of New England municipal bonds as a check on the results obtained from the railroad bonds. We did not consider using such indexes as a substitute for the railroad indexes. The market for municipal bonds has never been such a highly developed market as that for railroad bonds. The accuracy and adequacy of the quotations on which our index of the yields of New England municipals is based are not to be compared with the accuracy and adequacy of the railroad quotations. Available quotations were neither very good nor very numerous. Moreover, the fact that the holder of municipal bonds has always had certain tax exemptions, which were sometimes more and sometimes less valuable, made such

bonds poor material for our purposes. We dropped them entirely as soon as the Federal Income Tax Law began to function.

We were faced with the necessity of using bonds from one or more *industries*. We discovered that if bonds are to be used from more than one industry, each industry should be used by itself for a reasonably long period. Switching back and forth or using even the best bonds of two or more industries at the same time may easily lead to undesirable statistical results. Rather than to switch from one to another, it would seem better to use bonds from different industries independently, construct an index from each industry and attempt to arrive at conclusions by comparing the indexes.

When the decision to use only one industry had finally been made, the railroad industry was the inevitable choice. There was no other industry whose securities were of comparable importance in January 1857, the date we knew we could reach by using railroad bonds. Until many years after 1857 good public utility bonds were scarce. Until very recently, the bonds of no other industry have had the high credit rating of railroad bonds. Even in the recent collapse of railroad credit, railroad bonds of the very highest grade sold on a lower yield basis than any other corporation bonds. We constructed some very helpful index numbers based on the yields of public utility bonds in recent years. But, during most of the period studied, not only were such bonds few in number and mostly of rather low grade but also they were seriously affected by ambiguity of yield. Most of them had callable or convertible features, or both.

Accurate daily quotations for the prices of railroad bonds on the New York Stock Exchange are available back to January 1, 1857. We were unable to find any official sheets before that date. We did not attempt to carry the study further back by using quotations from newspapers. Entirely aside from the fact that newspaper quotations were, in the early days, not nearly so accurate as those contained in the official sheets, it did not seem worth while to attempt to go further back than 1857. January 1857 carries the series into the period that preceded the panic of 1857. Only a few years earlier the railroads were in their mere infancy and price quotations were very scarce and the yields unmistakably but irregular representatives of interest rates. Even for the year 1857 we found only thirteen bonds that could be used. Moreover, the scatter of the yields was very great. The best bond we used in January

1857 had a yield of 6.27 per cent while the worst bond we used had a yield of 9.84 per cent. It is apparent that, in order to get even thirteen bonds in 1857, we had to include some decidedly questionable ones.¹⁶

The original sources from which we calculated the yields for the individual bonds were in all instances price quotations, never yield quotations. Almost all the bonds were listed on the New York Stock Exchange, a very few being obtained from the Philadelphia, Boston or Baltimore Exchanges. No 'over the counter' quotations were used.¹⁷ For those bonds that were listed on the New York Stock Exchange we obtained quotations for the period January 1857 to December 1877 from the New York Stock Exchange official sheets referred to above. From January 1878 to the present time our primary source for quotation for bonds listed on the New York Stock Exchange was the files of the *Commercial and Financial Chronicle*, and the *Financial Review*¹⁸ published by the same journal. In many instances, mathematical calculations that were made on the yields suggested that certain price quotations were wrong. Wherever such a suggestion occurred other sources than the *Commercial and Financial Chronicle* were used as checks.

In the very earliest period we felt compelled to use almost every railroad bond for which we could obtain continuous or nearly continuous quotations (unless the movements of its yield were unmistakably erratic and violently different from the movements of the average of the group), but in the period after the first few years, we chose the bonds with considerable care. In the first place, we discarded all bonds whose yields were so high as to indicate that their credit was decidedly poor. We knew that their prices would move more like stock prices than we desired. We were studying interest rates. When the movements of the yield of a bond showed any great irregularity, we investigated what was happening to the road and in the market at that time. Usually we

¹⁶ But the reader must not assume that we present an average of the yields of these bonds as picturing anything more than the condition of the industry. How these yields were used to obtain the yields of hypothetical bonds of superlative grade is discussed in the next chapter.

¹⁷ Only in constructing the indexes of the yields of New England municipal bonds did we use 'over the counter' quotations.

¹⁸ The *Financial Review* was not used before 1878, because the prices that it quoted were 'bid' prices on Friday of each week. All the prices for railroad bonds used in this book are actual sale prices. Bonds listed on the Philadelphia, Baltimore and Boston Exchanges were obtained from various sources, official sheets, magazines, etc.

found some outside influence that made the bond undesirable. After a large number of such investigations, we discarded bonds without investigation, when the movement of their yields was so violently erratic as to warrant the assumption that an investigation if made would disclose some good reason for elimination.¹⁹

Few bonds with callable or convertible features were used. The decision whether such a bond could be used was based on two considerations. First, we checked its action with the action of a tentative general index to see whether the callable or convertible features seemed to have any discoverable effect on its yield. Second, we attempted to decide logically whether the bond would or would not, in the near future, be influenced by either the callable or convertible feature. In case of doubt the bond was not used.²⁰

As far as possible we used only bonds having fairly continuous price quotations. We considered the absence of quotations for two or more months in succession much more serious than their non-availability for the same number of months not in succession. Interpolations were made on the assumption that the movements of the logarithms of the yields of the particular bond in the interpolation period were the same

¹⁹ Had the technique described in Chapter IV been developed before we began our study, instead of as we progressed, we undoubtedly would have been much less particular about what bonds we included.

²⁰ Whether a bond will or will not be called depends upon its yield to maturity at the call price *on the call date*. If the particular corporation or government can borrow at the call date (and pay expenses of floating the issue) at a lower rate than the yield of the bond to maturity at the call price and on the call date, the bond will be called, otherwise it will not.

For example, if a 6 per cent railroad bond, having forty years to run, is selling for \$114 (to yield 5.17 per cent to maturity), but is callable thirty years from now at \$112, there might be no good reason for assuming that it would be called—in spite of the fact that it is not only selling above par but also above the call price. On the call date at a price of \$112, with ten years to run, the yield would be 4.50 per cent. It might easily happen that this particular railroad would not call the bond because it could not save money by so doing.

There is one serious exception to the above statements. Sometimes the yield to maturity on the call date and at the call price is a relatively unimportant element in deciding whether the bond will or will not be called. Suppose a bond maturing twenty years from now were callable in ten years at a price that would give a yield of only 2 per cent from the call date to maturity. Such a bond might be called if it were necessary to get that particular bond out of the way to clear the decks for some consolidation or reorganization. Even rumors of such consolidations or reorganizations will powerfully affect the price (and hence the yield) of a bond. However, such cases are rare. We discarded only two bonds on this account.

as the movements of the logarithms of the general index, plus or minus a straight-line trend.²¹ An examination of Appendix A, Table 3 will show that interpolations are not numerous. Only in seven years were they in excess of ten per cent of the total number of individual yields. The largest percentage of interpolations (13.63) occurs in the thirteen-month period January 1898 to January 1899. After 1919 almost no interpolations were necessary.

With very few exceptions, no bond was selected unless it could be used in the index numbers for at least six years without coming closer than ten years to maturity. Since 1909 no bond was kept in the indexes after it had less than fourteen years to maturity. The inclusion of relatively short term bonds in the earlier period was unavoidable. There were not enough longer term bonds available at that time.

No attempt was made to attain a geographical distribution of the railroads whose bonds were used. We are concerned with interest rates, not with changing economic conditions in various parts of the United States. It was considered more important to know that the bonds were being bought and sold in the same market than to know the geographical location of the property. Even Canadian railroad bonds were used if they were actively traded in on the New York Stock Exchange.

Because we were primarily concerned with interest rates rather than

²¹ The actual arithmetic of the procedure was as follows: suppose the yield of a bond was lacking for June and that in the particular 13 months under discussion 27 bonds were used. Now suppose that we had the yields of 25 bonds for May, June and July. From these 25 bonds index numbers of yields for the three months would be constructed. The difference between the logarithm of the yield of the particular bond in May and the logarithm of the yield of the index in May would then be found. Similarly the difference between the logarithm of the yield of the particular bond in July and the logarithm of the yield of the index in July would be found. If the logarithm of the yield of the particular bond in May, minus the logarithm of the yield of the index number in May be represented by x , and the logarithm of the yield of the particular bond in July, minus the logarithm of the index in July be represented by y , then to the logarithm of the index number in June is added $\frac{x+y}{2}$. The anti-logarithm of the result is then taken as the yield of the particular bond in June.

After the first index had been constructed some new bonds were introduced. However, the existing interpolations were not then recalculated, since it was apparent that so little difference would be made that recalculation would not be worth while. The interpolated yields are therefore not always exactly what they would have been had they been based on the final index number. The effects of this technical inconsistency are, of course, negligible.

with mere security prices, we did not hesitate to use two or more bonds of the same road. Indeed, we sometimes used two bonds of the same road and secured by the same mortgage, but of different issues, where the only difference was in the coupon rates. The reader must remember that even if two bonds are of the same road, have identical maturity, security, etc., if they are not identically the same bonds, they commonly show a considerable degree of variation in their minor erratic fluctuations. Arbitrage in bonds does not entirely eliminate such differences. If an individual has a block of bonds which he desires to sell and places them on the market in rather rapid succession, his selling will depress the price of that particular bond without necessarily affecting to a corresponding degree the price of another bond, though it be of the same road and have the same maturity and an almost identical position in the capital structure.

The prices from which yields were calculated were arithmetic averages of the high and low prices for each bond for each month. It would have been impossible within the time at our disposal to have calculated monthly averages from daily quotations—and few of the bonds were sold every day in the month. The average monthly price obtained from a high and a low was assumed to be the price of the bond at the middle of the month. The yields were first calculated from ordinary bond tables and then checked with a Johnson and Darville bond yield chart.²² In Appendix A, Table 1 is given a description of each bond used; in Appendix A, Table 2 are given the monthly high and low prices of each bond used from January 1857 to January 1879 inclusive. The latter table was introduced for this particular period to facilitate the work of future students of the subject. We felt that some investigators might be interested in checking up the relations of the price of greenbacks in gold to the movements of these bonds during this period and for that purpose might be interested not only in yields but also in prices. The table is not continued beyond January 1879. In the succeeding gold period the reader is likely to be satisfied with 'yields'. Moreover, while it is difficult to obtain some of these prices of the earlier period, it is relatively easy to obtain the prices of the later period.

²² The use of this nomograph makes arithmetic interpolation between yields and between dates unnecessary. The possible error in reading is seldom more than one one-hundredth of one per cent. The chart was patented in 1922 by its inventors and is sold by Prentice-Hall Inc., New York City. It is described, with illustrations, in Justin H. Moore's *Handbook of Financial Mathematics*, pp. 501-5.

They are nearly all contained in the files of the *Commercial and Financial Chronicle*. In Appendix A, Table 3 is presented the yield of each individual bond monthly from January 1857 to January 1936, inclusive. Appendix A, Chart 29 shows the period during which each individual bond was used in the construction of index numbers.

Having selected the bonds and calculated their yields we proceeded to consider the construction of index numbers.²³ The first problem that now presented itself was that of adjusting the yields in order to equalize the maturities—or better perhaps say to equalize the 'durations'. As our problem was the measurement of long time interest rates, it seemed desirable to define the term 'long'. If we defined 'long' as 15 or any other specific number of years 'duration', we were immediately faced with the fact that, in any particular year, perhaps none of our bonds had a duration of exactly 15 years. Moreover, even if each of their durations were exactly 15 years, with each succeeding year those durations would decrease.

We asked ourselves, would it not be possible from the actual yields of bonds with various durations to calculate what the probable yield would have been if each bond had had at all times the same duration—say 15 years. We puzzled over this problem for some time. In some periods we found a quite perceptible degree of correlation between yield and duration. In general when short term rates such as those for call money, time money and commercial paper were high, the bonds with shorter durations tended to show the higher yields, and *vice versa*, when short term rates were low, the bonds with shorter durations tended to show the lower yields—though in almost all cases there were some evidences of 'lag'. However, the scatter was always extremely great and the correlation always small. The bonds differed not only in duration but also in grade. The regression was unmistakably non-linear though the curvature was, of course, distinctly less than if *maturity* had been used instead of 'duration'. We experimented with various functions of the yields; and with partial regression, attempting to introduce the element of *security* into the problem by assuming it to be measurable in terms of the yields themselves. But the scatter invariably

²³ Index numbers intended to show the course of long term interest rates must be based on *yields* and not on *prices*. A 4 per cent bond selling on a 5 per cent basis will increase in price from year to year if it remains on a 5 per cent basis. Similarly a 6 per cent bond selling on a 5 per cent basis will decrease in price from year to year. Neither price movement would have any simple relation to the interest rate problem.

remained so large as to make any equation derived from the data unmistakably worthless. We finally gave up all attempts to correct for 'duration'. The adjusted yields always seemed to smack too strongly of unreality.

We must admit that consequently a disturbing element, for which we have not corrected, remains in all our results. Moreover, as both the average maturity and the average duration of the bonds we used were shorter in the earlier than in the later period, the index numbers naturally refer in the earlier period to shorter term interest rates than they do in the later period.

In constructing any index number of railroad bond yields for such a long period as from 1857 to 1936 it naturally is impossible to carry the same bonds through the index. The bonds mature and disappear and, if they are being used to measure long term interest rates, they must be discarded years before they mature. This condition naturally necessitated many substitutions in the index. Such substitutions were always made in a January. The resulting index number is therefore a 'chain' index number, made up of 79 separate pieces, each extending over 13 months. The direct comparisons are always from one January to the second January, from the second January to the third, and so on, the intervening months falling into their respective places. In other words, there is always a group of bonds that is unchanged from one January to the next, making possible a comparison from that January to the next with an identical group of bonds. The 79 separate index numbers, each covering 13 months, were chained together in the following manner: If the January 1924 average obtained from the yields of the group of bonds used in the 13 months, January 1924 to January 1925, was eleven-tenths of the January 1924 average obtained from the yields of the group of bonds used in the 13 months, January 1923 to January 1924, it would be multiplied by ten-elevenths. If the adjustment were being made backwards the second January average would be multiplied by eleven-tenths.

As the bonds used in the index number are changed, comparisons of distant dates might be thought to become more and more dangerous. On the other hand, we must remember that railroad bonds constitute a relatively homogeneous group. The introduction of even an entirely new group of bonds each January would not necessarily lead to bad results. We seldom changed any large percentage of the bonds in any

one January. Both the number dropped and the number introduced were usually small, but this is probably not very important. Perhaps as many dangers are connected with keeping the same bonds throughout as arise from changing them. We must remember that there is no particular magic in continuing to quote the price of 'the cow with the crumpled horn' until she becomes a museum piece.

No 'weighting' was used in the construction of any of the various index numbers.²⁴ Each yield has a weight of one. It did not seem advisable to attempt to assign other than equal weights to the individual yields. While it would be possible to construct a set of arbitrary weights based on the number of bonds outstanding, the number traded in, or other similar criteria, it is questionable whether there would be much value in any such procedure. Weighting by number of shares outstanding would seem highly reasonable if we were constructing an index number of stock prices. And weighting by number of bonds outstanding might be defended in the construction of an index of bond yields that was designed not to exhibit the course of interest rates but rather the fortunes of the borrowing corporations and of the investing public. It would seem a distinctly arbitrary and erratic system of weighting were we concerned primarily with interest rates. On the other hand, if we use *number of bonds traded in* as a basis for a set of weights, we shall find ourselves weighting an issue less and less heavily as it becomes seasoned. The heaviest trading occurs immediately after a bond is issued. Some of the best bonds become more and more inactive, until finally they cannot be used at all because months elapse without a single sale. If, however, anything happens to shake the confidence of the investing public in an issuing corporation, its bonds come out of safe deposit boxes and the volume of trading immediately increases.

As our index numbers are—from the nature of the data—necessarily 'chain' numbers, it is extremely important that no type of averaging used shall involve any mathematical 'drift'. We present index numbers based on geometric and arithmetic averaging, *but the averages are averages of the yields themselves*. They are not averages of 'relatives'. Not merely the geometric but also the arithmetic averages are therefore free from mathematical drift.

²⁴ Except the implicit weighting in the illustrations of the results of constructing chain index numbers from January to January from averages of *relative* prices with either the earlier or the later January as 'base'.

There are drifts in the averages, to be sure, but they are not mathematical drifts. They are economic drifts. They are caused by secular and cyclical changes in the grades of the bonds. Because their outlook is more seriously affected by fluctuations in earnings, lower grade bonds of course change in grade more violently than do bonds of better grade. This explains why the geometric and arithmetic averages show long time tendencies to drift together or drift apart. From 1857 to 1872 and from 1920 to 1930, and indeed in general from 1857 to 1930, indexes based on arithmetic averaging and indexes based on geometric averaging drift together as we move forward in time. During other periods, such as 1911 to 1920 and 1930 to 1932, they move more or less sharply apart.

But the drift is an economic drift. So long as an industry as a whole is, either because of general business conditions or because of conditions peculiar to the industry, in a period of health and growth, the spread between the yields of any two bonds, one low grade and one high grade, will tend to decrease. Similarly, the 'scatter' of the yields of a group of bonds of various grades will tend to decrease and hence the arithmetic and geometric averages of the yields will tend to approach each other. If the industry enters upon a period of declining business and profits, the scatter of the yields and hence the spread between the arithmetic and geometric averages will tend to increase.

But this drifting together and apart of the arithmetic and geometric index numbers is of greater theoretical than practical importance. For all practical purposes (as may be seen from Appendix A, Table 4) the two index numbers move together. But there is a drift in *both* which is of great importance. In January 1925 the figure for the geometric index (4.774 per cent) and the figure for the arithmetic index (4.776 per cent) are respectively the actual geometric average and the actual arithmetic average of all the bonds used in that month. However, the chain index constructed from geometric averages shows a yield of 9.517 per cent in January 1857 although the actual geometric average of all the bonds used in January 1857 was only 7.994 per cent.

Moreover, the above comparison does not present the picture in as strong colors as it should be presented. There is every reason for believing that the bonds which each month throughout the period showed the very lowest individual yields were much more nearly of the same grade throughout the period than was the average of all the bonds. Now the geometric average index number for January 1857 (9.517, per cent) is

152 per cent of the yield of the 'best bond' in the same month (6.27 per cent) though in January 1925 the index (4.774 per cent) is only 106 per cent of the yield of the best bond used in that month (4.50 per cent). The arithmetic differences are even more startling than the ratios. In January 1857 the difference between the geometric index and the yield of the best bond was 3.25 per cent while in January 1925 it was only 0.27 per cent. The relations of the geometric index to the yields of the best bonds and to the actual geometric averages of the bonds used each year may be seen in Chart 1. The evidences of a pronounced downward drift are unmistakable.

The arithmetic average index numbers show a slightly greater downward drift. We have used the geometric average index numbers to illustrate drift because the reader is less likely to wonder whether he is not faced with a problem of *mathematical* drift or, as Professor Fisher terms it, 'bias'.

In the next two chapters we discuss further the nature of this economic drift. We describe not only how it can be eliminated to obtain index numbers of the yields of hypothetical bonds of superlative grade but also how it can be separated out, measured, and used by itself as an index of the degree of difference at any particular time between the movements of the yields of high and low grade bonds. Finally, we describe its relation to the movements of the yields of preferred stocks and the movements of the prices of common stocks and show how, when properly interpreted, it brings together all securities into one great family.

CHAPTER IV

THE RELATION OF THE MOVEMENTS OF BOND YIELDS TO THE GRADES OF THE BONDS— ECONOMIC 'DRIFT'

THE drift of the arithmetic and geometric index numbers of railroad bond yields referred to at the close of the preceding chapter is, as we there stated, not a mathematical drift. It is an economic drift. It is not like the upward drift of chained arithmetic averages of relative prices or the downward drift of chained harmonic averages of relatives. During most of the period covered by this study (January 1857 to January 1936) the drift has been *downward* but that *direction* was not mathematically necessary. Indeed, the drift was sometimes upward. For example, while the geometric index figure (see Appendix A, Table 4-1) for January 1857 (9.52) was more than 151 per cent of the yield of the lowest yield bond used in that month (6.27) and the index figure for January 1929 (4.50) was only 104 per cent of the yield of the lowest bond for that month (4.33), the index figure for January 1933 (5.22) was 128 per cent of the lowest yield for the month (4.06), or *larger* than the percentage (127) that the index figure for January 1865 (6.87) was of the lowest yield for that month (5.43). In other words, using such a criterion of drift, we find a pronounced *downward* drift from January 1857 to January 1929, a period of seventy-two years; but, on the other hand, when we compare January 1865 with January 1933, sixty-eight years from the one date to the other, we find for the period as a whole, a slight *upward* drift.

An examination of Chart 15, on which a cumulation (inverted) of the drift¹ is presented, shows that the *upward* drift of the yields of the lower grade bonds was so great in the recent economic collapse that, from November 1928 to June 1932, the cumulated drift recovered all

¹ The method used to measure drift is explained later in this chapter.

the ground it had lost from 1865 to 1929.² The picture presented by Chart 15 is one of rapid drift *downward*³ from 1857 to 1872, an irregular but roughly *horizontal* movement from 1872 to about 1900, a renewal of the rapid drift *downward* from 1900 to 1912, an *upward* drift from 1912 to 1920, a pronounced *down* drift from 1920 to 1929 followed by an *up* movement, so violent that it can hardly be described as a 'drift' at all, that lasted until the middle of 1932.

In 1913 Professor Wesley C. Mitchell published an index number of the yields of ten American railroad bonds,⁴ monthly, from January 1890 to December 1911 inclusive. Now, though there seems to have been little or no 'drift' in railroad bond yields from 1890 to 1900, there was a pronounced down drift from 1900 to 1912⁵ and hence the total drift from January 1890 to December 1911 was strongly downward. This downward drift showed itself, as was to be expected, in Professor Mitchell's group of bonds. He noticed and explained it. His discussion and comment runs, in part, as follows:⁶

"The differences shown by Table 19 among the net yields of the ten bonds may readily be accounted for by differences in the proportionate value of the underlying properties, by the existence or non-existence of prior liens, by the relative financial strength of the issuing or guaranteeing corporations, etc. Similarly, the frequent changes in rank among the bonds may be ascribed to alterations in these particular conditions, which a well-advised investor considers in estimating the risks he runs in buying securities.

"But there is one fact of more general interest about these differences in yield. The margins between the higher and lower yields have grown narrower in the course of twenty years. In 1890 the maximum difference was 5.24-3.88 per cent=1.36; in 1900 it was 4.40-3.42 per cent=0.98; in 1909, 4.24-3.87 per cent=0.37. The chief cause of this narrowing of the margins has been an improvement since the middle nineties in the credit of the lower grade issues among investors. The risks imputed to the holding of bonds of such railways as, for example, the Chicago and Eastern Illinois have diminished. With one exception—the bonds of the West Shore Railroad—all the bonds gave lower yields in 1911 than in 1890. The West

² For the figures, see Table 6, Appendix A.

³ Note again that in Chart 15 the cumulated drift is *inverted*.

⁴ There were no substitutions; the same ten bonds were used throughout the period.

⁵ The violent up-drift during 1907 was immediately offset on the cumulated drift by the violent down-drift of 1908 and the first half of 1909 (see Chart 15).

⁶ *Business Cycles* (University of California Press, Berkeley, 1913), pp. 156 and 157.

Shore bonds, guaranteed principal and interest by the New York Central and having over 400 years to run, were rated decidedly higher by investors in 1890 than any other security in the present list. But, since then, the improvement in the financial condition and prospects of other railways has gradually brought their obligations closer to the high standard of securities guaranteed by the New York Central. Indeed, in recent years the bonds of the Burlington, the Milwaukee, and the Central of New Jersey have frequently outranked the bonds of the West Shore."

This is all quite as one might expect. Movements of the yields of bonds of the highest grade reflect primarily changes in 'long term interest rates'. On the other hand, movements of common stock prices reflect also the market's estimate of future earnings and dividends. Bonds other than those of the highest grade naturally partake of the nature of both the highest grade bonds and common stocks. The movements of their yields are affected not only by long term interest rate considerations but also by forecasts of earnings. In Chapter V it is shown that there has been a noticeable similarity between the major movements of the cumulated railroad bond yield 'drifts' and the major movements of prices of railroad common stocks. And the secular trend of railroad stock prices was upward from January 1890 to December 1911 while the secular trend of the cumulative bond yield drift was downward.⁷

But, though the drift in the index numbers based on arithmetic and geometric averages of the yields themselves is not a 'mathematical' drift, the reader may possibly wonder to what extent it is a merely technical drift. In the selection of the bonds, those that improved in quality year after year were not discarded because of that fact but those that deteriorated *very rapidly* (as the roads became bankrupt or ran into great financial difficulties) were eliminated. And, as the reader will realize later in this chapter, the retention of such bonds throughout their periods of deterioration and collapse might easily have affected to a greater or less extent the movements of the cumulated 'drift'—by reducing its downward movements and increasing its upward movements.

Indeed, if such deteriorating bonds had been retained, the cumulated drift line of Chart 15 might possibly have been more a shadow of the

⁷ In connection with this *inverse* relation, the reader must note that the comparison is not between stock prices and bond prices but between stock *prices* and bond *yields* (see Chart 15).

stock price line than it is.⁸ It is intriguing to think so. When an economist presents an interesting statistical relation to his readers' attention, it is pleasant to imagine and he may easily be tempted insidiously to suggest that, if the data were more adequate or more skillfully handled, the relation would stand out even more strikingly than it does. And, in at least one minor movement (from January 1903 to January 1904, during which time stock prices declined violently while the cumulated 'drift' of the bond yields also declined, instead of advancing as it would have been expected to do), the non-conformity is clearly traceable to the difference in the action of medium grade and definitely low grade bonds, as seen in the non-linearity of the scatter.⁹

But, unfortunately, tests with unchanging groups containing bonds of grades ranging all the way from the highest to really low grade suggest strongly that the elimination of bonds when they begin to deteriorate rapidly, as evidenced by the rise in their yields, has usually only a very minor effect on the *long term* movements of the cumulated linear drift. Convexity of the scatter¹⁰ over a short period of falling stock prices tends to be followed by concavity while stock prices are recovering and the *long term* effects on cumulated linear slopes to be thus offset.

That mere changes in the list do not necessarily increase the downward drift is well illustrated (though not proved) by comparing the cumulated drift of our changing list of bonds from January 1890 to December 1911 with the cumulated drift of Dr. Mitchell's unchanging list of ten bonds. The ratio of Dr. Mitchell's index number to our unadjusted geometric index was, in January 1890, 1.04. In January 1900 it was 1.03, and in January 1911, 0.99. The ratio of his index number to our unadjusted arithmetic index was in January 1890, 1.03, in January 1900, 1.02, and in January 1911, 0.99. The downward drift of his index number was therefore slightly *greater* than that of our unadjusted numbers.

Indexes from which drift has not been eliminated are not indexes of the yields of a uniform grade of bonds. They have, moreover, no essential relation to the average yield of all bonds outstanding

⁸ The reader must be reminded again that the cumulated drift line of Chart 15 is, on that chart, *inverted*.

⁹ See Chart 8 and discussion in the last section of this chapter.

¹⁰ With respect to the x axis.

or to the average rates at which new issues are coming out. They are indexes 'of the net returns which permanent investors have received upon current purchases of bonds' only if the assumption be made that the investors bought only these particular bonds. To have included a few bonds of a lower grade than those used would probably have altered not merely the level of the index numbers, but also their movements. In a period of downward drift, it would increase the downward (or decrease the upward) movement of the index numbers. Though it is true, as Dr. Mitchell has suggested, that index numbers from which drift has not been eliminated tell a different story from those without drift, that story, as we shall see, is more difficult to interpret than he indicated:

"The average yield of all ten bonds is the best available gauge of the changes in the rates which large American corporations have paid for new loans on long time since 1890, and also the best gauge of the net returns which permanent investors have received upon current purchases of bonds. But it is distinctly not the best gauge of changing rates upon long loans of substantially uniform security. For the latter purpose the yield of the West Shore bonds is preferable, since the financial credit of the guarantor was so firmly established in 1890 as to be little shaken by the years of depression and little strengthened by the years of prosperity. In other words, the yields of this issue reflect the changes in the supply of, and the demand for, loan capital for fixed investment with less distortion by the factor of risk than do the yields of the nine other bonds. But, since the yields of the other bonds are more typical of American experience since 1890, the detailed tables have been arranged to show both the net yields of the West Shore bonds, and the average net yields of all ten" (*Business Cycles*, p. 157).

Though Dr. Mitchell was correct when he stated that the yields of West Shore 4's give, during the period he was covering, a better picture of 'changing rates upon loans of substantially uniform security' than does his index based on the arithmetic average of the yields of ten bonds, the fact is that the yields of no single bond are completely adequate for this purpose. There are erratic movements in the yields of any individual bond, even West Shore 4's. Though West Shore bonds acted for long periods remarkably well, there is strong evidence that their grade varied appreciably at times. For example, a comparison of their yields with the yields of the very highest grade railroad bonds,

or better, with the '4.50 sigma' index, which we present and explain later, shows that the West Shore bonds were declining in grade from 1890 to 1900 and improving from 1900 to 1911. Since 1930 the bond has been definitely out of the class of bonds of the highest grade.

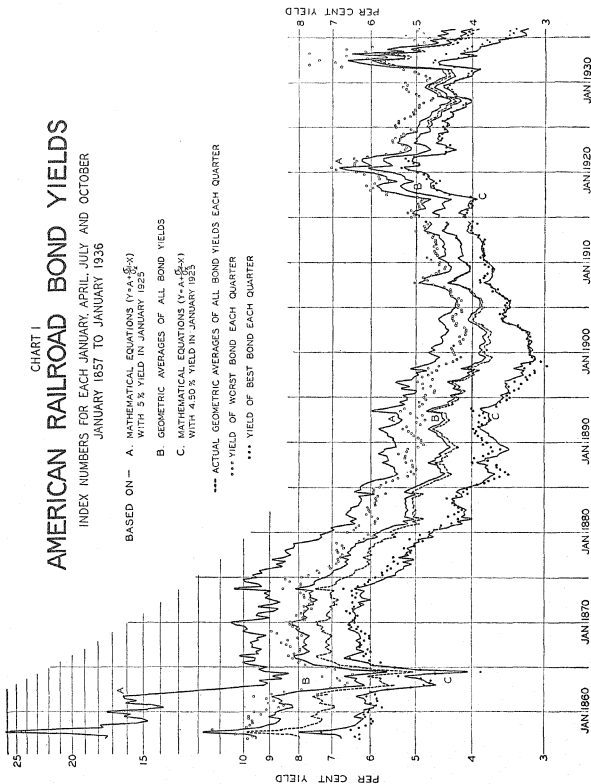
How well 'changing rates upon loans of substantially uniform security' may be measured by the yields of individual bonds may be seen by examining Chart 2. One of the indexes (line C) of that chart was constructed by chaining together the yields of three extremely high grade bonds:¹¹ bond no. 10 (Pennsylvania 6's, due December 31, 1880) is used from January 1857 to January 1870; bond no. 33 (Lehigh Valley 6's, due June 1, 1898), from January 1870 to January 1886; and bond no. 70 (West Shore 4's, due January 1, 2361), from January 1886 to January 1936.

If, instead of constructing an index number by chaining together the yields of a few high grade bonds (as is done in Chart 2), we use as the index for each month the yield of the bond showing the lowest yield in that month, we should, theoretically, obtain an even closer approximation to a measure of the yield of long term loans of an extremely high and nearly unchanging degree of security. The difficulties of this procedure are practical rather than theoretical. Because any especially good bond may shoot forward into first place in any particular month, such an index tends to be distinctly more erratic in its minor movements than one constructed by chaining together a few superlative bonds. Furthermore, the necessity of removing entirely from the field of choice a specific high grade bond because it has approached too close to maturity may cause sudden erratic movements in the level of the entire index number. The next best bond available may be selling on an appreciably higher yield. Of the bonds we used in this study, the yields of those having the lowest yield each January, April, July and October, together with various index numbers, are presented on Chart 1.

It might be thought that an improvement on both procedures outlined above could be made by constructing a chain index number, using each month the yield of the bond having the lowest yield in that month and carrying *the same bond* through to the next month. Each of the individual index numbers that would be chained together would be

¹¹ The West Shore bonds were allowed to remain in the chart after 1930 to illustrate how a bond may suddenly deteriorate even though it has been high grade for years.

CHART I
AMERICAN RAILROAD BOND YIELDS
 INDEX NUMBERS FOR EACH JANUARY, APRIL, JULY AND OCTOBER
 JANUARY 1857 TO JANUARY 1936



only one month long. The first piece would consist of the yield of the bond having the lowest yield in the first month and the yield of *the same bond* in the second month. The second piece would consist of the yield of the bond having the lowest yield in the second month and the yield of this same bond in the third month, etc. Such an index number would be free from the sudden changes in level that result from using each month the unadjusted yield of the bond having the lowest yield in that month. Moreover, during periods when the chaining procedure happened to use the yields of only one specific bond, the results would, of course, be similar to those shown by line C of Chart 2.

However, when the bonds used are not the same bond, a clear-cut *upward* mathematical drift would be introduced. In any particular month the bond selected is the bond having the lowest yield in that month. If the same bond has the lowest yield in the next month, the movement of the index will be the same as the movement of an index that used each month the unadjusted lowest yield. If the bond used in the first month is not the bond having the lowest yield in the second month, it must have a higher yield. One step in an upward drift has been made. That step can never be retraced. We begin all over with the bond having the lowest yield in the second month. In general, the shorter the periods used for the individual index numbers, the greater will be the upward drift. It was clearly not worth while to calculate such an index number on a monthly basis merely for the purpose of showing that it had an upward drift such as to make it totally unusable.

But we did calculate one such index on an annual basis—January to January each year. Beginning in January 1857 with the yield of the bond having the lowest yield in that month (6.27 per cent) and working forward, the index gives a value of 5.63 per cent for January 1879. In that month the yield of the 'best bond' was 4.86 per cent, and even the geometric average of all the bonds used was only 5.71 per cent. By January 1900 the index is 3.83 per cent. This is greater than the geometric average of all the bonds used in that month (3.73 per cent). The yield of the best bond was only 3.18 per cent. In January 1932 the index stood at 7.73 per cent. This is not only much greater than the yield of the best bond in that month (4.57 per cent) and greater than the geometric average (5.68 per cent) but also actually a shade greater than the yield of the bond showing the highest yield of any bond used in that month (7.72 per cent). The results

FIGURE 2
FOUR INDEX NUMBERS OF THE YIELDS OF AMERICAN RAILROAD BONDS

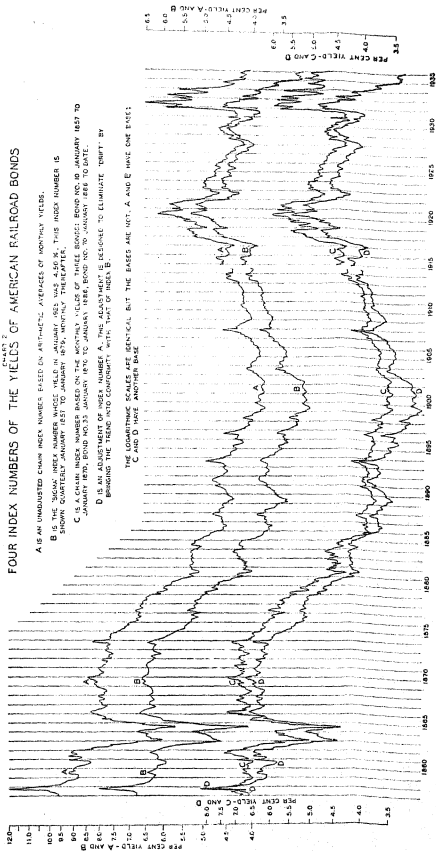
A IS AN UNADJUSTED CHAIN INDEX NUMBER BASED ON ARITHMETIC AVERAGES OF MONTHLY YIELDS.

B IS THE "SICMA" INDEX NUMBER WHICH YIELD IN JANUARY 1921 WAS 4.50 %, THIS INDEX NUMBER IS SHOWN QUARTERLY JANUARY 1ST TO JANUARY 1879, MONTHLY THEREAFTER.

C IS A CHAIN INDEX NUMBER BASED ON THE MONTHLY YIELDS OF THREE BONDS: BOND NO. 10 JANUARY 1827 TO JANUARY 1879, BOND NO. 33 JANUARY 1879 TO JANUARY 1886, BOND NO. 10 JANUARY 1886 TO DATE.

D IS AN ADJUSTMENT OF INDEX NUMBER A. THIS ADJUSTMENT IS DESIGNED TO ELIMINATE 'DRIFT' BY BRINGING THE TENDENCY CONFORMITY WITH THAT OF INDEX B.

THE LOGARITHMIC SCALES ARE IDENTICAL BUT THE BASES ARE NOT. A AND E HAVE ONE BASE; C AND D HAVE ANOTHER BASE.



would have been still more startling if we had constructed the index on a monthly instead of a yearly basis.

An index number constructed by chaining together individual pieces each of which consisted of the yield of the lowest yield bond at a particular date and the yield of the same bond in the *preceding* year or month would show a contrary mathematical drift, downward instead of upward.

More interesting results may be obtained if we do not restrict ourselves to one bond. Index numbers constructed from the best five bonds in each yearly period naturally show much less erratic and individualistic movements than index numbers constructed from the yields of single bonds.

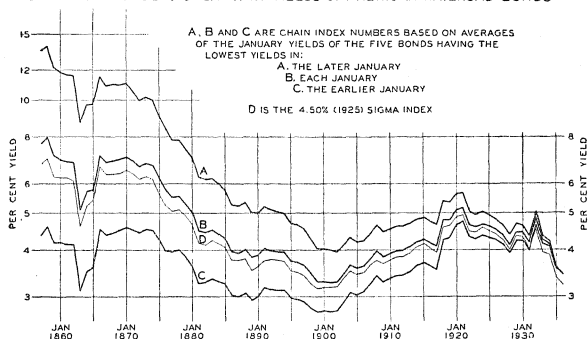
Our bonds are in annual groups. Each group contains quotations for the yields of certain bonds from January to January inclusive. If out of such a group we select the five bonds having the lowest yields in the first January and the five bonds having the lowest yields in the second January—whether or not they be the same—and compare the geometric average of the yields of the five bonds chosen in the first January with the geometric average of the yields of the five bonds chosen in the second January, we obtain a set of 79 index numbers each extending from one January to the next.¹² The result of chaining together these 79 index numbers is presented in Chart 3 (line B). Line D is the '4.50 sigma' index, which we later present as a tentative solution of the problem of drift. It will be seen that the index constructed from the best five bonds, in the manner we have just described, is very similar to the '4.50 sigma' index. The downward drift is slightly greater but the year-to-year movements are almost identical. This particular five-bond index has, of course, no mathematical drift. For example, the same results would be obtained if the index were cal-

¹² Though the 'best' five (or lowest yield) bonds chosen in a particular January in order to construct the index number from the preceding January to that January are usually the same as the best five bonds chosen in that January to construct the index number from that January to the succeeding January, they are not always so. The dropping of old bonds and the introduction of new bonds sometimes prevents such a condition. For example the 'best' five bonds chosen for January 1925 to construct the index number from January 1924 to January 1925 are not the same bonds as those chosen to construct the index number from January 1925 to January 1926.

culated from month to month as if it were calculated from year to year.

Chart 3 shows two other indexes based on the best five bonds each January. One of these (line C) is constructed by chaining together yearly indexes in each of which the geometric average of the yields of the best five bonds in the earlier January is compared with the geomet-

CHART 3
FOUR INDEX NUMBERS OF JANUARY YIELDS OF AMERICAN RAILROAD BONDS

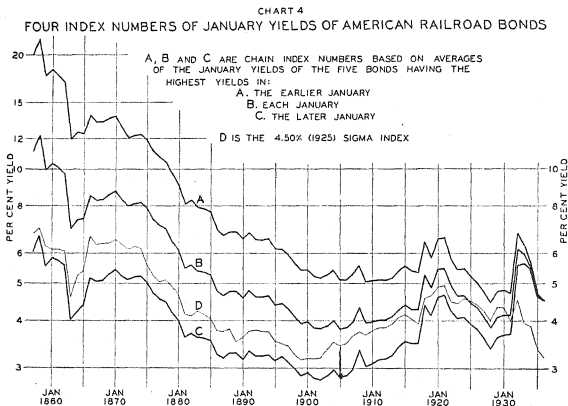


ric average of the yields of the *same five bonds* in the later January. In the other index (line A) the five bonds are the best five in the later January and the comparison is made with the yields of the *same five bonds* in the earlier January. Both the upward drift of the index of yields based on choosing the bonds in the earlier January¹³ and the downward drift of the index based on choosing the bonds in the later January are, of course, mathematical and not economic drifts. The drift would in each case have been greater if the indexes had been constructed from month to month instead of from year to year. The three

¹³ As a digression, it may be interesting to note that the index based on choosing the best five bonds at the beginning of the year gives a rather sad picture of the fate of the investor who would buy nothing but bonds with the very lowest possible yields, on the assumption that such low yields proved the bonds to be of the most desirable type, and insisted upon selling them, whenever their yield rose, and re-investing in other 'superlative' bonds.

index numbers based on the 5 bonds having the lowest yields each year are presented in Appendix A, Table 5.

Chart 4 is introduced as a further illustration of mathematical rather than economic drift and to show the dangers of attempting to correct for economic drift by means of introducing a mathematical drift that is in the opposite direction.



the *worst* five bonds instead of the best five bonds, that is, the five bonds having the highest yields instead of the five bonds having the lowest yields. Throughout most of the period 1857-1936 there has been a pronounced downward economic drift in the yields of these 'worst' bonds. However, the mathematical upward drift introduced by picking them in the later January and comparing the geometric average of their yields in that January with the geometric average of the yields of the *same* bonds in the earlier January (see line C) is more than sufficient to overcome the downward economic drift.¹⁴

On the other hand, the intermediate movements show driftings apart and driftings together. After remaining below D until January 1931,

¹⁴ Indeed, if the chaining had been from month to month instead of from year to year, line C would have shown an almost continuous *upward* drift when compared with the 4.50 sigma line.

the line C suddenly shoots up and remains thereafter much above D. The minor movements of the two lines often have little or no relation to each other. While the adjustment for drift obtained by using the *best five bonds, regardless of whether they were or were not the same bonds in both Januaries*, is an economic adjustment and led to relatively good results throughout, the adjustment based on choosing the *worst five bonds in the later January* is purely mathematical. The goodness of the results in any period is quite accidental.

It is quite illegitimate to attempt to eliminate economic drift by means of a formula giving a mathematical drift in the opposite direction. In the first place, the economic drift is not necessarily in the same direction in one period as it was in the preceding period, whereas the mathematical drift tends to be always in the same direction. In the second place, any mathematical drift that results from 'chaining' varies in degree with the duration between the items chained. Monthly chaining gives a more pronounced drift than yearly chaining.

The disturbing effects of economic 'drift', of course, usually increase with the length of time covered. Over short and comparatively undisturbed periods index numbers from which drift has not been eliminated often have a relatively definite and simple significance. Without any great error, they may be interpreted as picturing the movements of the yields of bonds of the same grade. Over long periods they may, however, have little essential relation to the yields of bonds of any specified grade. Even if the same bonds are used throughout, their grade at the end of the period, as seen from the relation of the average of their yields to the yields of the best bonds, may be entirely different from what it was at the beginning of the period.

Of course, if we had been interested only in *eliminating* drift, we might, as has already been suggested, have done so pretty well by some such procedure as the chaining together of indexes made up from the yields of the five lowest yield bonds whether they were the same bonds at both dates or not. But we were fully as much interested in discovering the characteristics of drift and how it can be measured as we were in eliminating it. We wished not merely to present a picture of the movements of the yields of railroad bonds of the highest grade but also to show how bonds of lower grade acted and to present in as simple a mathematical form as possible the statistical relations between the movements of the yields of bonds of different grades.

And, finally, we hoped to be able to bring the movements of stock prices into the bond yield picture.

We soon came to the conclusion, already presented in the preceding chapter, that no definite solution could be obtained by studying the financial statements of the railroads. 'Margins of safety', etc., are illusory and misleading. The real 'margin of safety' that counts is in the future, not the past. It is better to trust to the opinion of the market. The simple and direct way to decide whether, at a particular time, one bond should be considered as of a higher or lower grade than another bond of the same coupon rate, maturity, marketability, etc., is to compare their yields. The problem is therefore to discover the relation between the movements of the yields and the yields themselves. When this problem is solved it becomes possible to construct, as a by-product, an index number of the yields of the highest grade bonds—even if the grade desired be somewhat higher than the grade of any of the bonds used in discovering the relation.

The railroad bonds we used had as long maturities as were available. Since, as already mentioned, we did not adjust for differences of duration, we formulated our problem as that of discovering, with the data available, what were the relations between the yields of identical bonds at different dates. We began our experiments by considering the matter graphically. We made scatter diagrams in which the yields at a particular date of the various bonds in a group were plotted along the x axis and the yields at a later date along the y axis. We plotted the logarithms of the yields rather than the yields themselves, because a linear relationship seemed more logical on a logarithmic scale than on a natural scale. For many reasons, we desired a linear relationship and the use of a linear relation with a natural scale would tend to lead to absurdities in just the region where we did not wish absurdities—the region of the lower yields. For example, if a straight line were fitted to the yields as such, it might cut the axes and so suggest that a positive yield in one period should be considered as normally associated with a *negative* yield in another period.

After constructing and examining a number of scatter diagrams, we next considered how we ought to fit straight lines to the logarithms of the data. What should be the criterion of fit? We of course realized that the yields in neither the earlier nor the later period—say the earlier or the later January—could logically be considered as independent vari-

ables. Both the yields in the earlier and the yields in the later January had to be considered as dependent variables. We did not wish to know what would be the probable yield in the later January of a particular bond having a specified yield in the earlier January any more than we wished to know the probable yield in the earlier January of a particular bond having a specified yield in the later January. For the same sort of reasons that we did not find it desirable to pick the best five bonds in either the earlier or the later January but in both Januaries, we desired a backwards and forwards relation between the yields in the two Januaries. To borrow an expression from the theory of least squares, our problem must be considered one in which both variables are assumed to be 'tinged with error'.¹⁵ The straight line must not be fitted in such a manner that the sum of the squares of either the vertical or the horizontal deviations of the data points from the fitted line be made a minimum but in such a manner that the sum (or, academically, one-quarter of the sum) of the squares of the vertical *and* horizontal deviations be made a minimum,¹⁶ if the size of the errors to which the two variables are subject is the same.

Both variables should be, for the purposes of our problem, considered as 'subject to error'. But we cannot assume that the size of the 'errors' to which each variable is subject is the same. In other words, we cannot assume that the 'errors' of the two variables should have equal weights. Using 'error' in the statistical sense of deviation, we know that the two variables are *not* subject to the same degree of 'error'. Their liability to error is clearly in proportion to their standard deviations. Before fitting the straight line we must therefore weight the variables in inverse proportion to the *squares* of their standard deviations. Such weighting will exactly correct for the fact that their liability to 'error' is in proportion to their standard deviations.

This may all sound rather high-handed. At first glance it might seem simple and proper to give the logarithms of the yields in each January equal weights. However, in a statistical problem in which both variables are considered as subject to 'error', the assumption of equal

¹⁵ Of course the statistician uses the word 'error' in a Pickwickian sense. When he measures the average height of a class of school children and finds that it is so many feet and so many inches, he does not consider the fact that all the children are not of that height as really an 'error' of either God or man.

¹⁶ Cf. Merriman's *The Determination by the Method of Least Squares of the Relation between Two Variables . . . both Variables being Liable to Errors of Observation* (U. S. Coast and Geodetic Survey, 1890), p. 687.

weights may be very misleading. It tends to prevent any real consideration of the problem of weighting. Only if the variables are measured in absolutely unlike units, such as length and weight or pressure and temperature, will the existence of the problem be even noticed. When, however, as in our problem, both variables are expressed in percentages—or logarithms of percentages—there is a strong tendency to let mere words lull us into the assumption that we have a problem requiring equal weights. However, in our particular problem, a procedure based on such an assumption would have led us to treat a one per cent deviation of observation from theory in one January as of the same importance as a one per cent deviation in the succeeding January, although the scatter of the yields in the later January might be so much greater than the scatter of the yields in the earlier January that their standard deviation was double that of the yields in the earlier January.

The slope of the straight line, fitted in such a manner that the sum of the squares of the vertical and horizontal deviations of the observed from the theoretical values (when weighted in inverse proportions to the squares of the standard deviations of the two variables), will be a minimum, is $\frac{\sigma_y}{\sigma_x}$, where σ_x = the standard deviation of the logarithms of the yields at one date and σ_y = the standard deviation of the logarithms of the yields at the other date. From the mean of the system,

the equation of the line is $y = \frac{\sigma_y}{\sigma_x} x$.^{note 17}

¹⁷ The weighting is in inverse proportion to the *squares* of the standard deviations, rather than in inverse proportion to the standard deviations unsquared; because the criterion of fit is that the *squares* of the 'deviations' shall be a minimum.

The 'deviations' are not, of course, equal to the perpendicular and horizontal distances of the observational points from the fitted line. For example, a *y* 'deviation' is not equal to the perpendicular dropped from the observational point to the fitted line, as it would be if the *x* variable were being considered independent. A *y* 'deviation' is the difference between the *y* of an observational point and the *y* of the corresponding theoretical point on the straight line. And that theoretical point is not perpendicularly above or below the observational point. The slope of the line joining an observational point to its corresponding theoretical point on the straight line is

$-\frac{\sigma_y}{\sigma_x}$, that is, the slope of the fitted line with a negative sign. Now the sum of the squares on the two sides of a right angled triangle adjacent to the right angle is equal to the square on the hypotenuse. It is, therefore, the sum of the squares of the *oblique* distances of the observational points from the corresponding theoretical points on the fitted straight line that is made a minimum.

If the straight lines be fitted in this manner, all index numbers based on readings from the fitted lines will fulfill the 'circular test'. If, on the other hand, the observations at the two dates be weighted 'equally', or indeed in any other ratio than in inverse proportion to the squares of their standard deviations, the index numbers obtained from readings on the fitted lines will not fulfill the 'circular test'. Some form or other of purely mathematical drift will be introduced. The results obtained by moving along from one month to the next in constructing the index numbers will not be the same as if we move from one January to the next January.

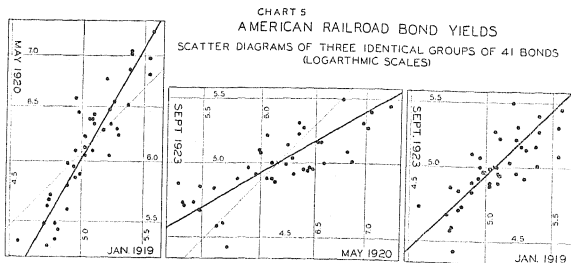
If ordinary 'regression' lines, in which only one variable is considered dependent, were fitted, the resulting index numbers (of lower than mean yields) would drift violently upward if the earlier dates were taken as the independent variables and violently downwards if the later dates were taken as independent. An index number constructed from our January-to-January scatters by taking the earlier Januaries as the independent variables and showing a yield of four and one-half per cent in January 1927 shows a yield of less than one-billionth of one per cent for January 1857. If the later Januaries be considered independent, a seven per cent yield in January 1857 is associated with less than one-billionth of one per cent in January 1927. The results would be even more extreme if the chaining were from one month to the next instead of from January to January.¹⁸

The fulfillment of the circular test may be illustrated by Chart 5. That chart contains three scatter diagrams. The same 41 bonds appear in each diagram. The heavy fitted line in each diagram represents the theoretical relation (weights of the variables in inverse proportion to the squares of their standard deviations) between the yields at an earlier date and those at a later date of bonds of different grades. The

¹⁸ In computing the scatter from one January to the next, the coefficient of correlation (r) might possibly equal $+1$. If r equaled $+1$, the fitted lines obtained from assuming one or other of the variables independent or from assuming them both dependent would, of course, be identical. The observations would all lie in the line.

If r is not equal to $+1$, both the equal weights line and the sigma line will be steeper than the x -as-independent-variable line, and less steep than the y -as-independent-variable line. When $\sigma_y = \sigma_x$, the equal weights line and the sigma line will be identical. Each will be inclined 45° , that is, have a slope of $+1$. When σ_y is not equal to σ_x , the sigma line will fall between the equal weights line and the 45° line. It will, therefore, be steeper than the equal weights line when σ_y is greater than σ_x and less steep when σ_y is less than σ_x .

light line inclined at an angle of 45 degrees is the line on which all points would fall if the ratio of the yield of each bond at the later date to the yield of the same bond at the earlier date had been, for all bonds regardless of grade, the same as the ratio of the geometric mean of the yields of all the bonds at the later date to the geometric mean of the



yields at the earlier date. The first diagram compares the yields in January 1919 and the yields in May 1920, a period during which high grade bonds acted *better* than lower grades. The second diagram compares the yields in May 1920 and September 1923, a period during which high grade bonds acted *worse* than low grade bonds. The third diagram covers both periods. It compares the yields in January 1919 and September 1923, a period during which there is no correlation between the grades of the bonds (as evidenced by their yields) and how they acted. The heavy fitted line in this diagram therefore coincides with the light 45 degree line.

Now, if we find, from an examination of the first diagram, that a yield of x in January 1919 should theoretically, as determined by a point on the heavy fitted line, be associated with a yield of y in May 1920 and, from an examination of the second diagram, that a yield of y in May 1920 should theoretically be associated with a yield of z in September 1923, we may know that, if from the third diagram we ask what yield in September 1923 should theoretically be associated with a yield of x in January 1919, the answer will be z . Index numbers constructed from readings of straight lines fitted by the method of least squares in such a manner that the sum of the squares of the vertical

and horizontal deviations, weighted in inverse proportion to the squares of their respective standard deviations, is a minimum, fulfill the 'circular' test. To avoid the continual use of lengthy phrases we shall from now on call a straight line fitted in such a manner a sigma line. We coined this term because the slope of such a line is $\frac{\sigma_y}{\sigma_x}$.

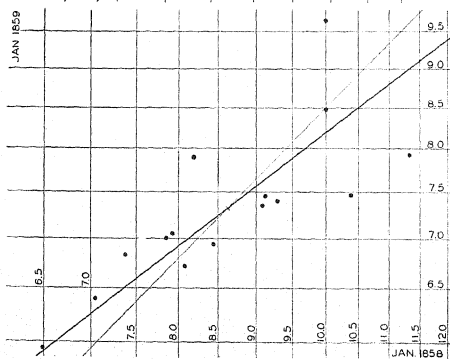
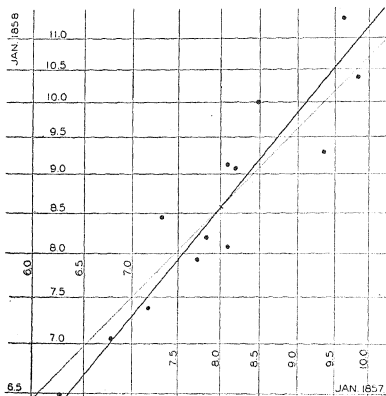
Chart 6 contains 79 scatter diagrams, one for each pair of Januaries from January 1857 and January 1858 to January 1935 and January 1936. Sigma lines are fitted to each scatter. From the nature of the slopes $\frac{\sigma_y}{\sigma_x}$ of a sigma line, the slope of a line fitted for two widely separated dates can easily be computed from the slopes of the lines for the intervening sections. Thus, if the standard deviation of the yields of a group of bonds be σ_x , in January 1920, σ_y in January 1921 and σ_z in January 1922, the slope of the sigma line for January 1920 and January 1921 will be $\frac{\sigma_y}{\sigma_x}$, for January 1921 and January 1922 $\frac{\sigma_z}{\sigma_y}$, and for January 1920 and January 1922 $\frac{\sigma_z}{\sigma_x}$. From the upper line of Chart 15 the reader can estimate the slope of the sigma line for any two dates. This upper line of Chart 15 represents the cumulated product of the slopes of the successive sigma lines fitted to the scatters of the yields in successive adjacent pairs of months. As the chart is drawn on a logarithmic scale, a difference in height of the line for any two different dates represents the logarithm of the slope of the sigma line applicable to those two dates.¹⁹ The annual and quarterly equations of the sigma lines are presented in Appendix A, Tables 7 and 8. The slopes of the monthly equations are given in Table 9.

The sigma lines may be used for two purposes and are so used in this study: (1) to construct index numbers, (2) to illustrate, measure and study the differences in the movements of the yields of bonds of different grades in different periods.

Beginning with any given yield at any particular date, we may construct a complete index number from January 1857 to January 1936. But the reader must not assume that such an index number would necessarily give a picture of the action of bonds of the same grade throughout the period. If the original yield with which the computa-

¹⁹ The 'difference in height' on the chart may be exactly determined from column 2 of Table 6 in Appendix A.

CHART 6

AMERICAN RAILROAD BOND YIELDS
SCATTER DIAGRAMS

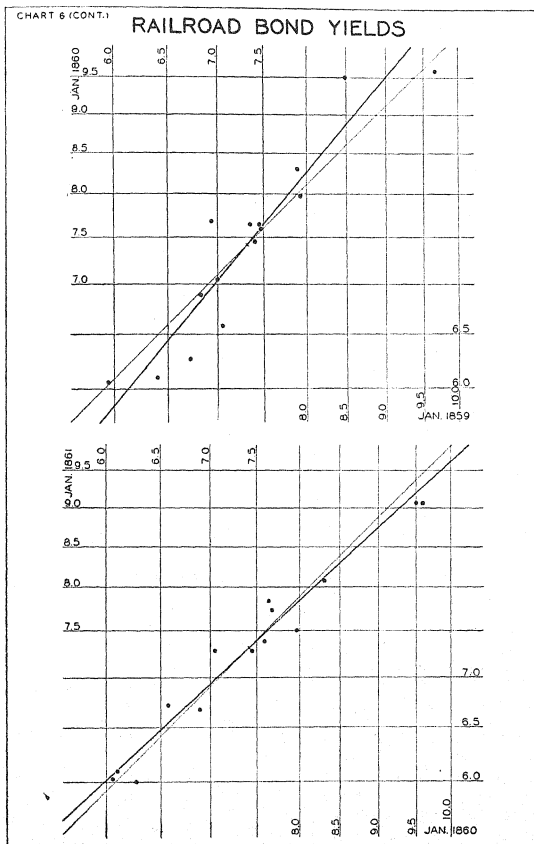
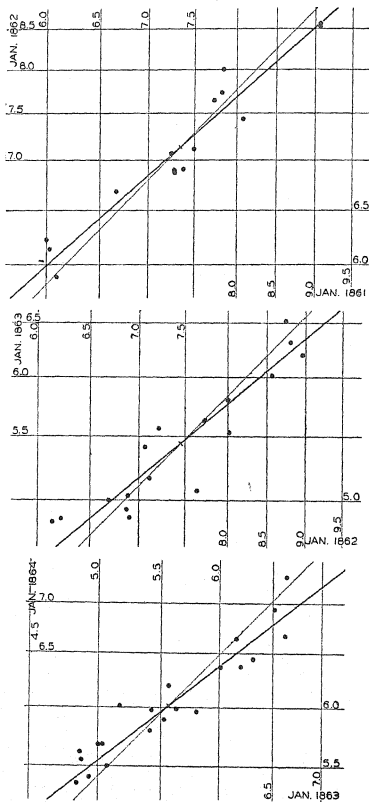


CHART 6 (CONT.)

RAILROAD BOND YIELDS



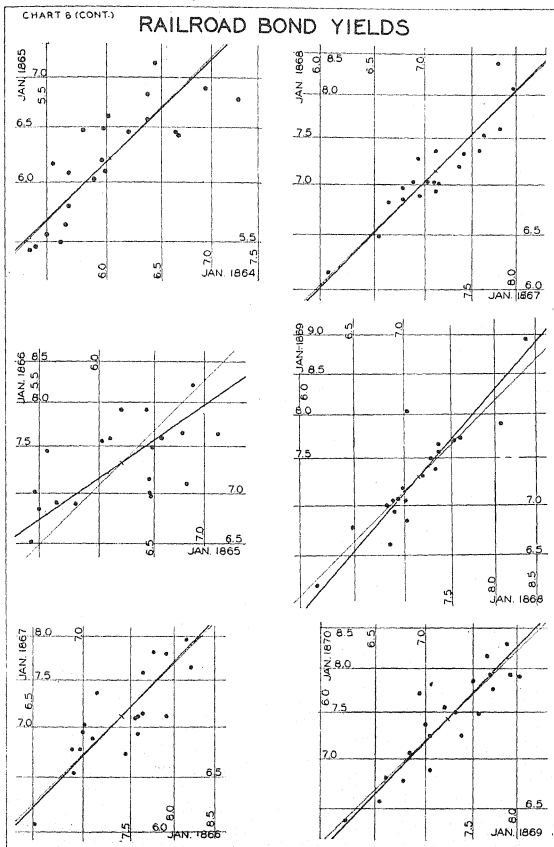
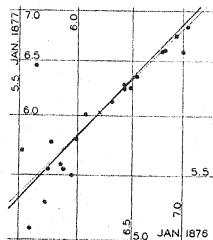
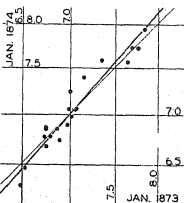
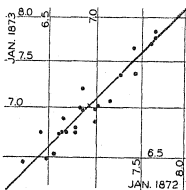
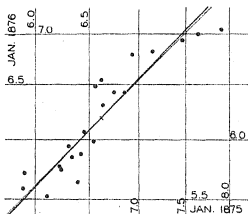
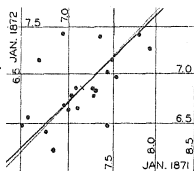
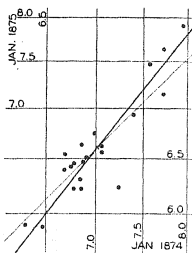
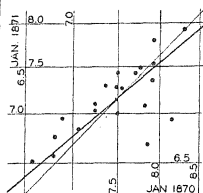
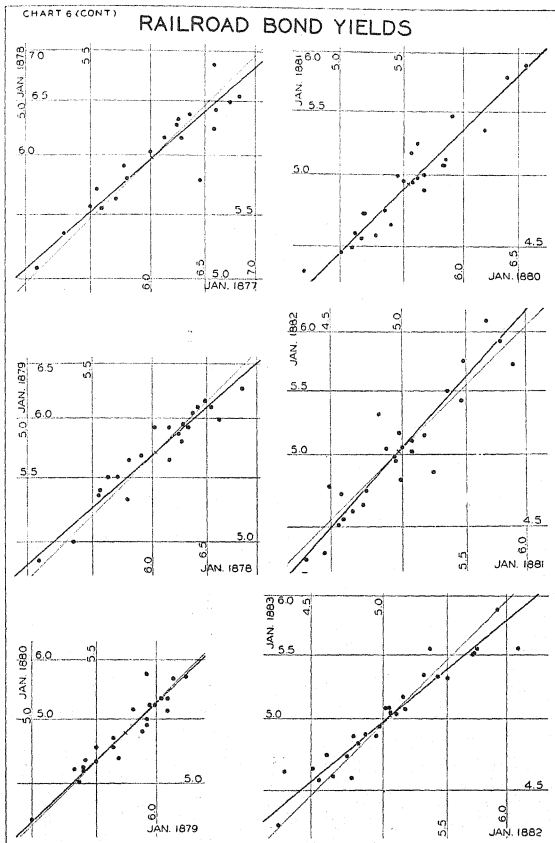


CHART 6 (CONT.)

RAILROAD BOND YIELDS





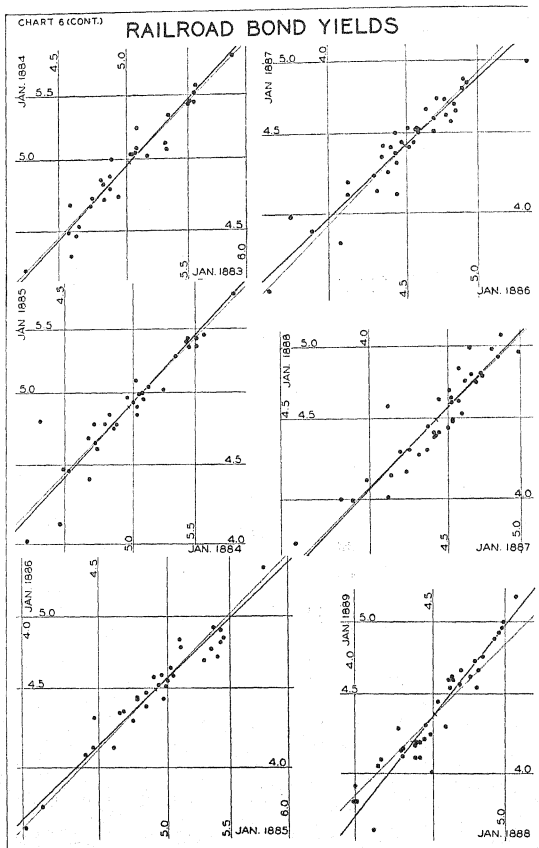
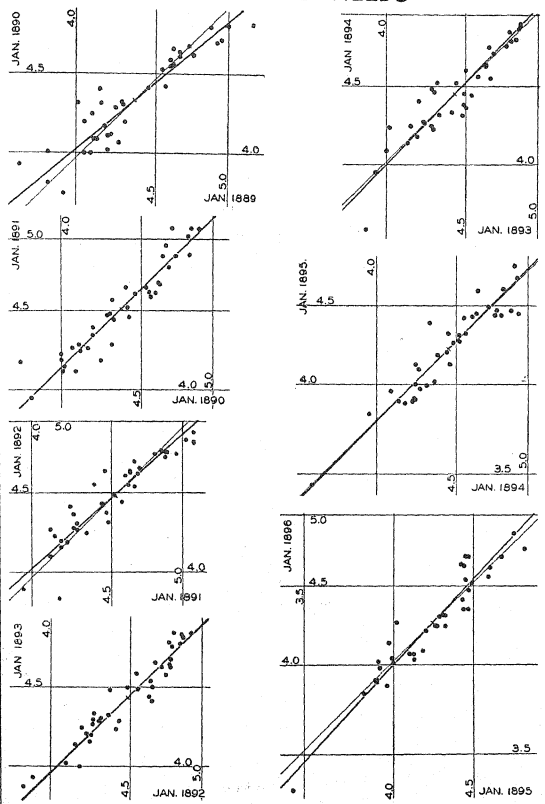
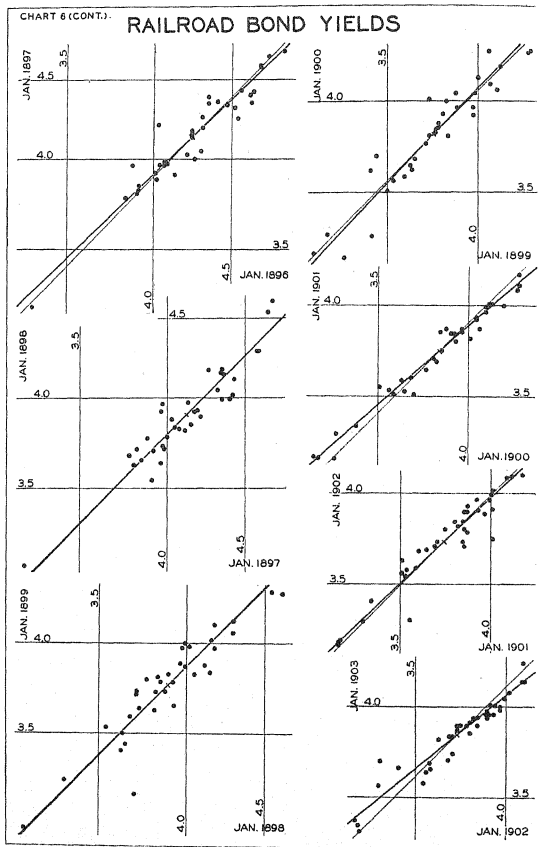


CHART 6 (CONT.)

RAILROAD BOND YIELDS





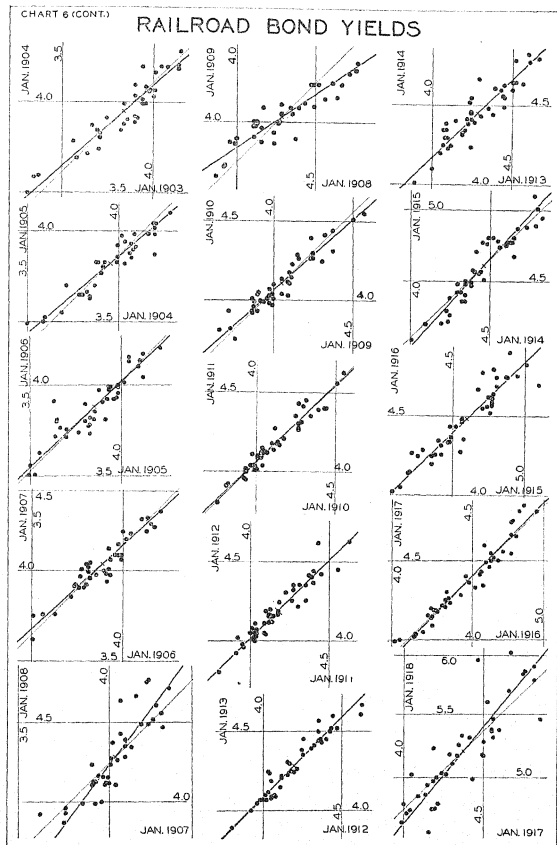


CHART 6 (CONT.)

RAILROAD BOND YIELDS

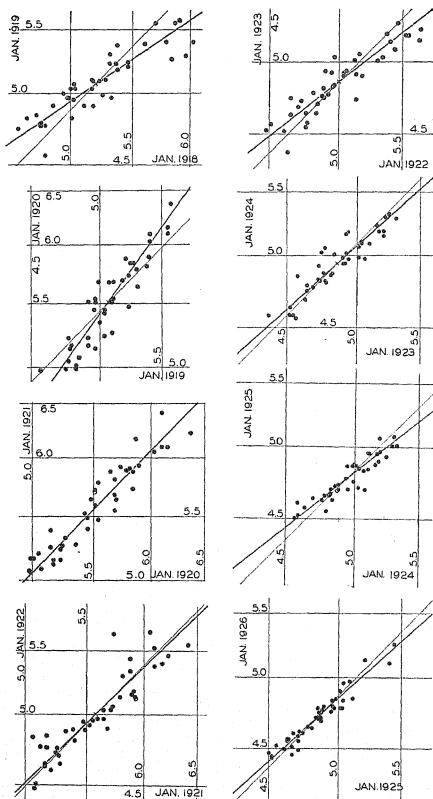
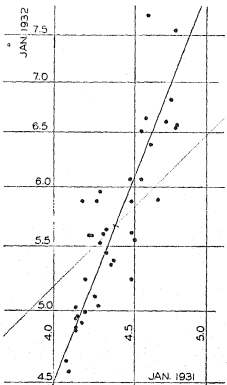
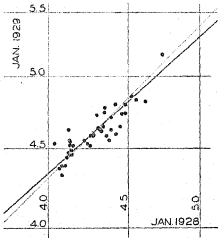
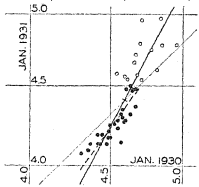
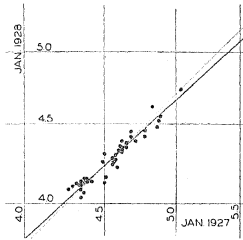
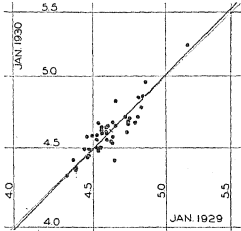
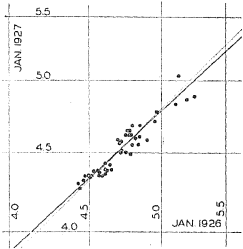
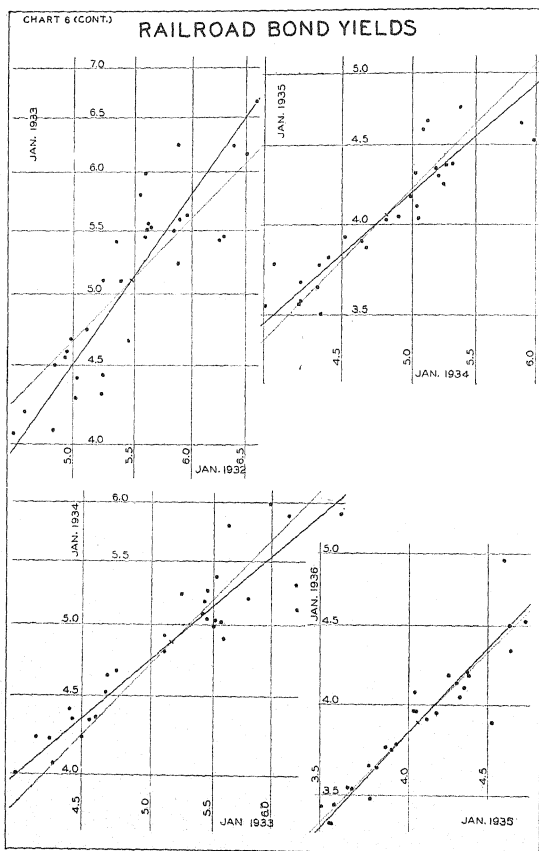


CHART 6 (CONT.)

RAILROAD BOND YIELDS





tions begin is a relatively high yield for the date to which it is attached, the index number will be affected by *drift*; and the essence of drift is that it is not a characteristic of the yield of bonds of low but unchanging grade but a movement *that results from change of grade*. The next step in the calculation is, therefore, from a new base, a new grade.

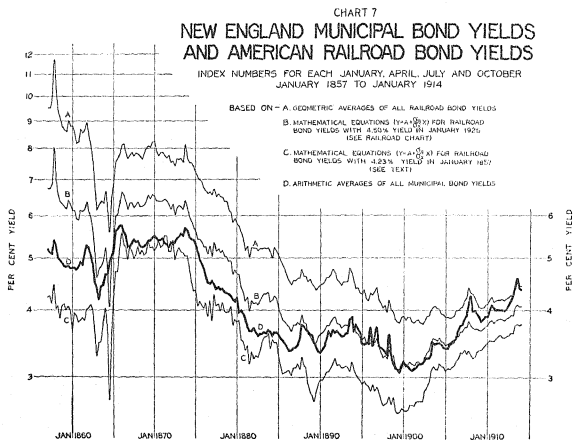
Drift, therefore, remains a disturbing factor unless the original yield from which computations begin is as low as the yields of bonds that at the time are so adequately 'covered' that none but really profound changes in the financial status of the debtor corporations could appreciably lessen the complete confidence of the market that all future payments would be met.

But the original basing point yield cannot safely be chosen appreciably lower than this, in other words appreciably lower than the yields of the best bonds, without introducing an element of unreality which results in an unmeaning pseudo drift in the direction opposite to that to which inferior bonds are subject. Of course, this simply means that extrapolation cannot, without sooner or later introducing palpable absurdities, be carried far into the unreal region of yields so low that no actual bonds can be found having such yields.

The index number that we calculated from the sigma equations to present a picture of the course of the yields of railroad bonds of the highest possible grade, a grade often slightly higher than that of any actual bond, was constructed by assuming a yield of 4.50 per cent in January 1925 and working backward to January 1857 and forward to January 1936. The lowest yield of any bond we used in January 1925 was 4.50 per cent. However, this is quite accidental. Throughout the entire period from January 1857 to January 1936, the sigma index, though it is more often lower than it is higher, tends to run fairly close to the yields of the lowest yield bonds. But it has no rigid relation to any individual yield. It weaves in and out among the lowest yields only because, in its character as an index from which 'drift' was presumed to be eliminated, it was designed to do so.

However, there is a possibility that some 'drift' remains in even this 4.50 sigma index. The 'best bonds' considered were after all only the best *railroad* bonds. Now an examination of the levels and movements of the highest grade New England municipal bonds in the period before 1914 can hardly fail to suggest that the best railroad bonds of the earlier years were not relatively so high in grade as were those of the

later years.²⁰ In Chart 7 there is presented not only the 4.50 sigma index, which shows a yield of 4.50 per cent in January 1925 and a yield of 6.75 per cent in January 1857, but also a sigma index that shows a yield of only 4.23 per cent in January 1857. A comparison of these two railroad sigma indexes with the index of the yields of New England municipal bonds presented on the same chart suggests that



either the yields of the New England municipal bonds had an upward drift during the period covered by the chart (January 1857 to January 1914) or the 4.50 sigma index had a downward drift. Since about 1875 the *long term* trend of the New England municipal bond index resembles the trend of the sigma index giving 4.23 per cent in Janu-

²⁰ At the top prices of 1857 the long term 5 per cent (gold) bonds of Boston and Massachusetts both sold at 99, to yield only a small fraction more than 5 per cent; during 1880 Boston 4's of 1899 sold as high as 105; at the top prices of 1897 both Massachusetts 3's of 1923 and Maine 3's of 1921 sold at par. Now the lowest monthly yield of any railroad bond in our 1857 list was 6.17 per cent; in 1880 the lowest monthly yield was 4.31; in 1897 the lowest yield was 3.08. The differences between these railroad yields and the Boston, Massachusetts and Maine yields are 1.1 per cent, 0.7 per cent and 0.1 per cent.

ary 1857 more than it does the trend of the sigma index giving 6.75 per cent in 1857.

The great differences in the movements of the New England municipal bond index and the railroad sigma indexes during the Civil War period are peculiarly difficult to explain. And possibly no great effort to do so is warranted. An examination of Chart 6 will immediately show how very appreciable the probable errors of the slopes of the sigma lines in parts of this period must necessarily be. And the assumption of linearity seems sometimes very difficult to defend.²¹ Chart 15 would suggest that, if the relation depicted by that chart is real, the measurement of drift from the wide and possibly non-linear scatters of the Civil War period may be very unreliable. For example, the downward drift must surely be underestimated from January 1862 to the middle of 1864 and overestimated from the middle of 1864 to the end of 1865.

But one of the difficulties of this argument is that great irregularities in the relationship pictured in Chart 15 occur in periods, such as that from the middle of 1877 to the end of 1880, in which the scatters are closely packed around the fitted straight lines and during which there is no great difference in trend between the New England bond index and the railroad sigma indexes. An adequate explanation of the difference in the movements of the municipal and railroad indexes during the Civil War may possibly lie in the different effects of the paper money inflation of the period on the prices and yields of the two types of bonds. However, we failed to develop any very appealing hypothesis offering an explanation on this basis.²²

²¹ Compare the January 1864 and January 1865 scatter in Chart 6.

²² The index of the yields of New England municipal bonds is a quarterly index. Monthly quotations are not regularly available.

The sources of the original quotations are materials gathered by Joseph G. Martin, a Boston stock broker, and his successors in his firm. For the period from January 1857 to January 1862, Mr. Martin's early book entitled "Twenty-one Years in the Boston Stock Market" was employed. The quotations in this book for 1857, 1858 and 1859 are monthly for the first day of the month. However, in 1860 and 1861 only quarterly quotations appear, namely, for January 2, April 2, July 2 and October 2 of 1860, and for January 1 (sic), April 1, July 1 and October 1 of 1861. The quotations used from January 1862 to January 1914 are from annual pamphlets issued by Mr. Martin at the end of each year. These pamphlets were entitled "*Stock Market Fluctuations*" or "*Stock Quotations from January — to January —*" or other closely similar titles that varied somewhat from year to year. Copies of these pamphlets are to be found in the Boston Public Library.

The credit standing of the leading New England municipalities underwent, during the period 1857-1914, no such radical changes as did the credit standing of many American railroads. Indeed, the best of the New England municipal bonds seem to have deserved about the same rating in 1857 as they did in 1914. That, throughout this entire period—aside from the erratic Civil War interruption—the railroad 4.50 sigma index drifts irregularly but continually downward relatively to the New England municipal index would seem therefore to present evidence of some significance. Our holding to the 4.50 index, in spite of this evidence, requires some explanation if not defense. Such an explanation or defense hangs naturally on two considerations: first, the difficulty of deciding how much drift, if any, remains in the 4.50 sigma index and, second, the virtual certainty that any attempt to obtain, from operations restricted to the railroad bond data, an index containing much less drift than the 4.50 sigma index would lead to highly questionable results.

When attempting to decide how much drift, if any, remains in the 4.50 index, we must remember that a difference in the yield of two bonds may result from a difference in the markets for the bonds as well as from a difference in the degrees of public assurance that the promised future payments will be met. The placing of a bond on a list of investments legal for trust funds and savings banks inevitably affects its yield. And mere custom has often almost the force of law. Only gradually did railroad bonds attain the legal status and the popularity with the most conservative investors that they possessed by the early (Footnote ²² concluded)

The quotations appear to have been at times estimated from the author's knowledge of the municipal bond market. There are occasionally bankers' buying rates when no transactions were actually recorded. The quotations are 'over the counter' rather than open public market quotations such as we used for railroad bonds. There are strong reasons for believing, however, that Martin's quotations, though they were not recorded with the same official exactness as were those of the railroad bonds, and though their accuracy proved, on experiment, to be insufficient to stand the strain of the sigma procedure, reflect with substantial correctness the movements of New England municipal bond prices and yields in the Boston market.

We made no attempt to extend the New England bond index forward beyond January 1914. In so far as we have made comparisons of railroad bond yields and municipal bond yields after January 1914, we have contented ourselves with the Standard Statistics monthly index of the yields of 15 municipal bonds. This index goes back to January 1900 (see Chart 10). Shortly after January 1914 the Federal income tax with its municipal bond exemptions began to introduce into the picture an extraneous element whose effects are difficult to measure.

years of this century. But, from 1857 to 1930, municipal bonds of the highest grade were 'prime' investments for the ultra conservative. As high grade railroad bonds came to be more and more introduced into the portfolios of such investors, they steadily weakened the monopoly enjoyed by the municipal bonds. With the increase in the composite supply, the yields of the municipal bonds inevitably tended to be greater than they otherwise would have been. The effect was the same as though the volume of the municipal bonds had itself been increased in the same proportion as the total.

Shall we then say that the yield of the railroad bonds was drifting down toward that of the municipal bonds or that the yield of the municipal bonds was drifting up toward that of the railroad bonds, or shall we say that both these things were happening, that the yields were drifting together? From January 1921 to the end of 1929 the interest bearing debt of the United States government declined steadily month after month and year after year. Throughout this period the yields of Federal bonds showed a pronounced long term *downward* trend relatively to the 4.50 sigma index. Shall we, therefore, say that, as these government bonds were throughout the period acknowledged to be of the very highest grade, the 4.50 sigma index had, during this period, an *upward* drift? And that, during the year 1931 for example, in which the interest bearing debt increased by leaps and bounds and in which the yields of Treasury bonds advanced much more rapidly than did the 4.50 sigma index, that index had a *downward* drift?

The 4.50 sigma index gives a picture of the course of the yields of *railroad* bonds of an ultra-superlative grade. It is hard to say just what meaning would have to be given to it if it were adjusted to the movements of high grade bonds in one or more other markets. It certainly would not give us a picture of that economic noumenon 'pure interest'.

A study of the corporations themselves gives us considerable reason to believe that the very best railroad bonds in the early period were inferior to the best bonds in the later period. But, from the yields of the best bonds in the early period or even from the yields of all the bonds in all the periods, it is difficult if not impossible to calculate plausibly what would have been, in the early period, the yield of a railroad bond of apparently as high grade as the very best railroad bonds in the later period. We have already referred to the danger involved in extrapolating the sigma lines far into the region of hypo-

thetical bonds of a higher grade than any actually existing bonds. This danger exists not merely because of the high probable error of the slopes of a few of the sigma lines for some of the January to January scatters and the high probable error which always appears as the slopes are cumulated, but also because of the evidences that the scatters are sometimes and perhaps always non-linear even on the log scale we have used.²³

The non-linearity of the relation between the yields at two dates, that sometimes appears when extremely high-yield securities are included in the scatter diagram, is illustrated by Chart 8. On that chart are plotted the yields of all bonds and dividend-paying preferred stocks listed on the New York Stock Exchange for which quotations could be obtained for both January 1903 and January 1904. An examination of the chart will show that, though a straight line gives a fairly plausible fit to the yields of the railroad bonds we actually used, it gives an extremely poor fit to the total scatter.²⁴ An hyperbola is suggested as an empirical curve that might describe more or less adequately the complete scatter. The railroad sigma line lies close to the lower arm of the hyperbola. The non-linearity of this scatter explains the lack of similarity between the cumulated-product-of-the-slopes-of-the-sigma-lines and the course of railroad stock prices in this period (see Chart 15). It is, of course, difficult to say to what extent the rather radical short term differences between the (1925) 4.50 sigma line and the (1857) 4.23 sigma line, such as the complete elimination by the 4.23 line of the 1873 peak (see Chart 7), are rational, are the result of high probable errors in the cumulated linear slopes, or are the result of non-linearity of the scatters.²⁵

²³ Chart 15 gives some support to the idea that the non-linearity is not of a constant type and that, over long periods, its disturbing effects tend to cancel out every now and then leaving approximately the same result as that obtained from the linear hypothesis. Whether this be true or not, non-linearity has certainly been very disturbing during some short periods, such as January 1903 to January 1905, a period about to be discussed in the text.

²⁴ In only one year out of the seventy-nine, 1857-1936, did this non-linearity affect the particular group of bonds we used in our index. In 1929-30 only twenty-eight bonds were used to calculate the sigma line. These are the bonds that appear as black dots on Chart 6. The white dots on this chart are the bonds that were omitted in that one year because they affected the linearity of the scatter. Two sigma lines appear on the chart. The solid line is fitted to the entire scatter. The broken line is fitted to the twenty-eight bonds and is the one we actually used in our calculations.

²⁵ Even the 4.50 sigma index sometimes shows a small amount of erratic irregularity

Chart 9 shows the yields of nearly all the railroad and public utility bonds listed on the New York Stock Exchange or the New York Curb Exchange for which quotations were available for the weeks ending January 7, 1930 and January 6, 1931. The interesting feature of this chart is that, though the railroad scatter appears to be distinctly non-linear, the public utility scatter appears to be comparatively linear, at least outside the range of almost absurdly high yields. There was, in this period, no such collapse of public utility credit as there was of railroad credit.

Because scatter diagrams are so enlightening we have presented a large number—84 in all. The primary reason for having each of the 79 diagrams of Chart 6 cover a period from one January to the next was that we substituted bonds only in January. Each diagram contains all the bonds used in a thirteen-month period. If we had used more critical dates, we would have had to use fewer bonds. Monthly scatter diagrams are seldom very impressive. The drift in a single month is usually so small as hardly to be manifest on a chart. The slopes of the sigma lines are nearly always close to 45° . Of course in a disturbed market even monthly charts are very instructive. Changes in grades are so violent that some of the monthly charts may look like yearly charts of a more normal period. Drift is unmistakable. Interesting as it would be to cover the recent past in much greater detail than the rest of the period, it was decided not to do so in this study. To have presented monthly scatter diagrams for even the last few years would have necessitated the publication of too many charts.

(Footnote ²⁵ concluded)

in its minor month-to-month movements. Line D of Chart 2 presents an index constructed by using a mathematical graduation that follows extremely closely all but the most minor movements of the 4.50 index (see Chart 14 to realize how closely) and on this graduation superimposing, as a substitute for the deviations of the 4.50 index, the deviations of the chain index number constructed from the arithmetic averages of the actual yields from a similar graduation of that index. The resulting composite index follows the 4.50 index in all respects except that it tends to eliminate the irregularities that sometimes appear in the most minor fluctuations of the 4.50 index. The composite index runs from January 1857 to January 1936 monthly. For the period from January 1857 to January 1879 the 4.50 sigma index was calculated only quarterly. Both the extreme similarity of the two indexes and their minor differences may be seen by comparing lines B and D of Chart 2.

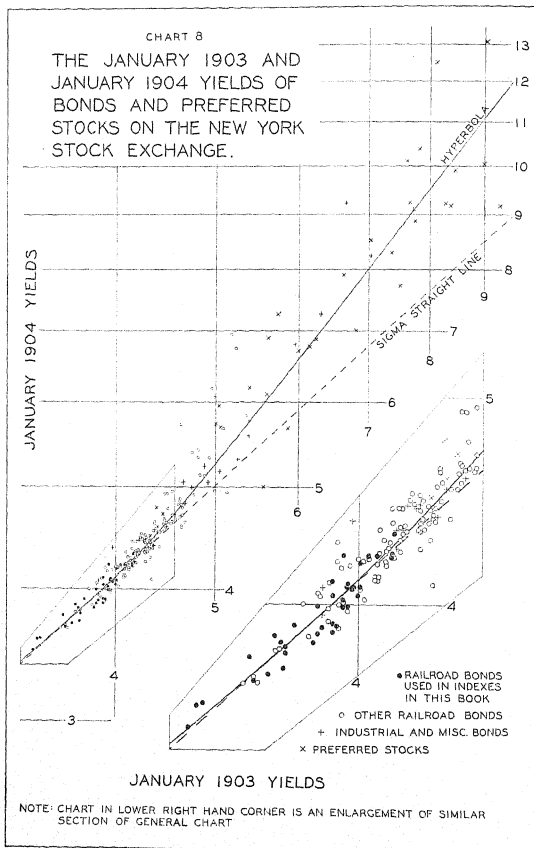


CHART 9

AMERICAN RAILROAD AND PUBLIC UTILITY
BOND YIELD SCATTER DIAGRAM

- • YIELDS OF INDIVIDUAL RAILROAD BONDS
- ○ YIELDS OF INDIVIDUAL PUBLIC UTILITY BONDS
- BOTH OPERATING AND HOLDING COMPANIES

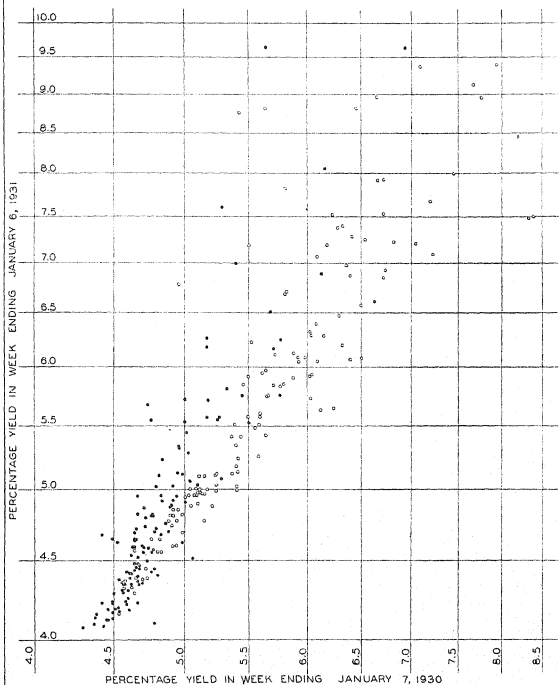


CHART 10
AMERICAN MUNICIPAL AND RAILROAD BOND YIELDS

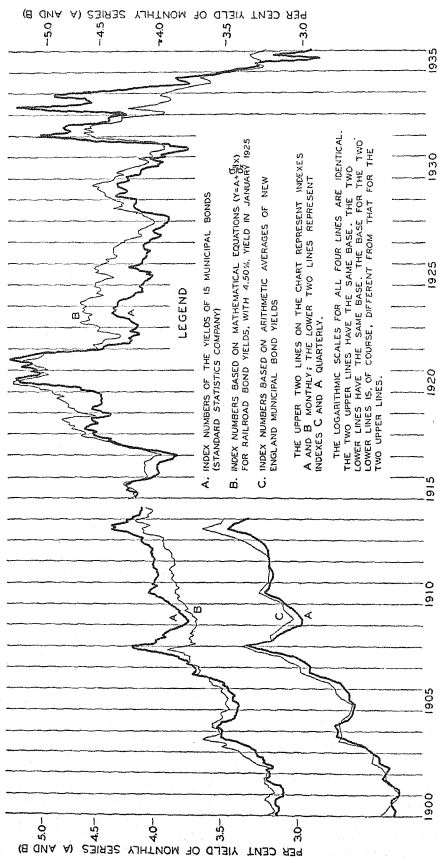
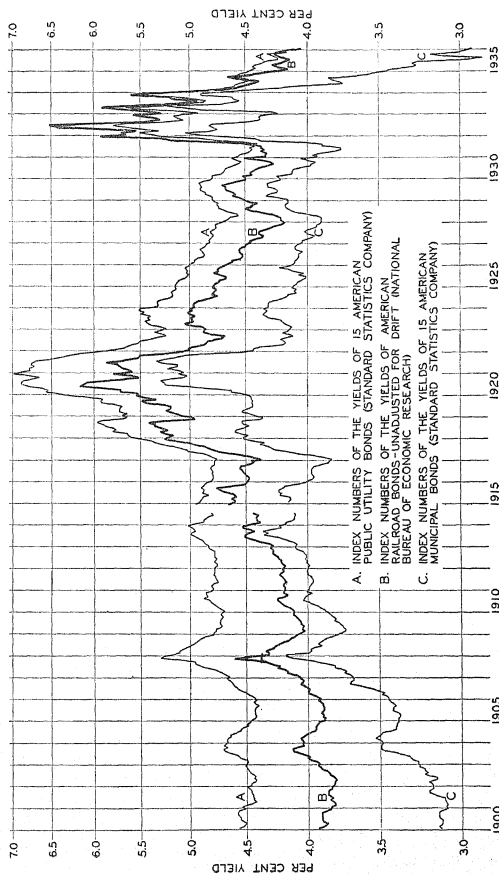


CHART II
DIFFERENT 'DRIFTS' SHOWN BY INDEX NUMBERS OF PUBLIC UTILITY BOND YIELDS,
RAILROAD BOND YIELDS, AND MUNICIPAL BOND YIELDS



CHAPTER V

BOND YIELDS, ECONOMIC 'DRIFT', AND THE PRICES OF COMMON STOCKS

IN THE preceding chapter we discussed the relation of the movements of bond yields to the grade of the bonds. At one stage of that discussion we introduced a scatter diagram containing not only bond yields but also the yields of preferred stocks. To go one step further and bring into the picture common stocks, the most junior securities of all, leads to some interesting results. But, before presenting those results, it is desirable to refresh the reader's memory of the nature of a corporation and the relation of bondholders and stockholders to the corporation and to each other.

A corporation is a juristic person; in the words of the Dartmouth College Case it is "an artificial being, invisible, intangible and existing only in contemplation of law". It is capable of acting in many but not in all respects as though it were a natural person. As a legal entity, it takes and holds property, and conveys the same; it contracts obligations, and it sues and is sued, in its corporate name, in the same manner as a natural person. For such purposes, the stockholders or 'members' of the corporation are disregarded. They compose the corporation, but they are not the corporation.¹

Though the stockholders may be thought of as owning the corporation, they do not own and cannot convey the corporate property.² But

¹ We must not obscure our present discussion by overloading it with exceptions and qualifications. For example, it is, of course, true that the concept of the corporation as a legal entity, separate and distinct from the members who compose it, is a mere legal fiction, introduced for the convenience of the corporation and of those who do business with it; and that, under certain circumstances, the fiction will be disregarded, and the fact that the corporation is really a collection of individuals be recognized in equity and even at law.

² This is technically true even when all the stock is owned by one person. While the

they have a definite beneficial interest in the corporate property, as may be seen from the fact that the courts have held that interest insurable. It is true that, upon dissolution, the legal title to the corporate property does not vest in the stockholders, but they still retain the beneficial interest therein, and, if the legislature has made no provision by which they can reach the property, and enforce their rights, they may come into a court of equity, and obtain relief. Such a court has jurisdiction, unless it has been taken away by statute, to reach the property of the defunct corporation, to cause the debts due it to be collected, and to distribute the assets, after payment of the creditors, to the beneficial owners, that is, to the members or stockholders.

The stockholders' beneficial interest in the corporate property extends to the profits of the corporation. A stockholder has the right not only to participate in dividends when they are declared but also to maintain a suit in equity to compel the directors to declare and pay a dividend if it is wrongfully withheld.

The bondholder is a creditor of the corporation. His claims are prior to those of the stockholder but they are limited and he has no vote nor, so long as the corporation is living up to its promises, has he any means of controlling the management. But, aside from the voting privilege, the interests of the bondholder and the stockholder in the corporation differ fundamentally only with respect to priority and limitation. The corporation is a cow from which each hopes to obtain milk.

And priority and limitation are not confined to bonds. Though the preferred stockholder may be classed by the law with the common stockholder he will tend to be classed by the economist with the holder of an income bond. And even the law has been known to waver in its discussion of preferred stocks and preferred stockholders. For example, some courts have held that a corporation has the power to create and issue preferred stock on the ground that such a transaction is virtually a borrowing of money, and that corporations have the power to borrow money, and may do it in this way.

The common stock is a blood brother of the preferred stock and the bond. Investments as a class constitute one family. They each originate in an exchange of present money for an expectation of future

(Footnote ² concluded)

corporation exists, he is a mere stockholder of it, and nothing else. Cf. *Button v. Hoffman*, 61 Wisconsin.

money. If it were not for such an expectation they would have no exchange value. And they lose that value as the expectation dies out. The demand that comes from the possibility of buying them and later selling at a profit may exist for a time in a sort of economic vacuum, but it is essentially a derived demand and, in the absence of any (warranted or unwarranted) expectation of future returns, it sooner or later disappears.

Because the good that the common stock offers to its purchaser is an expectation of future money payments, the relation of its present-money price to its future-money payments is as unmistakably an interest phenomenon as is the relation of the present-money price of a bond to its future-money payments. In the fullness of time the stock will have a 'realized' or 'actual' yield just as will the bond. And, though the stock makes no 'promise', as does the bond, and therefore has no 'promised' or 'hypothetical' yield, its price discounts *estimated* future payments as truly as does the price of the bond.³ It is the absence of promises and the high degree of uncertainty as to what the stock will pay, with the resulting inadequate forecasting, that obscures the interest relation. The fundamental difference between an ultra high grade extremely long term bond and a low grade common stock is that the future-money returns of the bond can be forecast with more assurance than can those of the stock. That an individual investor may prefer the one type of security to the other, because he believes that their market prices do not correctly measure the differences in their respective future probabilities, is a matter that concerns individual *forecasting* of future payments but neither individual nor market *discounting* of those payments.⁴

The promises contained in the bond are not merely assurances that, if possible, certain sums will be paid. They are also maximum values

³ For discussion of the terms *assumption of payment*, *promised or hypothetical yield*, and *realized or actual yield*, see Chapter II. In this book the term *yield*, unless the context makes it apparent that *realized or actual yield* is referred to, means *promised or hypothetical yield*.

⁴ For example, that bonds are almost inevitably a poorer investment than common stocks on the eve of a great currency inflation is evidence merely of bad market forecasting of how the inflation will affect the future money payments of the stocks. The rates at which future money is, at such a time, being discounted may be high or low, but, because they apply to the *anticipated* money payments of *both* the stocks and the bonds, they cannot explain why one is a better investment than the other. It is the error in the *anticipation* which explains that.

that cannot be exceeded. This is, of course, true of preferred stocks also. If the corporation is earning enough, the maximum values will year after year be the realized values. And this limitation leads to stability—the stability of a toy balloon pressing against the ceiling of a room. If the gas begins to escape, the balloon may drift down to the floor. But, only if it were outdoors could it ever soar to the clouds. There are upper and lower limits to the return from a bond. The return from a common stock has no necessary upper limit. Dividends may soar to the sky, but their only permanent level of stability is on the ground—with the corporation bankrupt.

The 'assumption of payment', which must be made before the promised or 'hypothetical' yield of a bond can be calculated (or obtained from a bond table), may, as we have seen, be a mere mathematical fiction for all except the highest grade of bonds. But, for common stocks it is not only a mathematical fiction but also an economic absurdity. Even if the chance that the promises contained in a bond will be kept is so negligibly small that the promises are little more than mere words, they are at least *definite* words and, as such, can stand the strain of mathematical manipulation.

But the common stock contains no promises. It is, of course, true that after sale, in other words *after the event*, the realized or 'actual' yield may be calculated for the period that the stock was held *and for the ex-holder* with the same assurance that it could have been calculated had the stock been a bond,⁶ but the promised or 'hypothetical' yield completely eludes definite determination unless assumptions are introduced that are so grossly conjectural as to be virtually supposititious.

And even small variations in the assumptions affect greatly the hypothetical yields. The assumptions must extend far into the future. Theoretically, they must specify *exactly* the amounts and dates of *all* future payments. Of course, practically it is not necessary to take into account those payments that are to occur in the far distant future. But the future period that may be neglected is much more distant than the reader might imagine had he not carefully considered the matter. If it be assumed that a share of common stock selling for \$100 is to return \$4 per annum *forever*, it may be thought of as having a promised or 'hypothetical' yield of 4 per cent per annum. But, if the pay-

⁶ This realized yield is, of course, not to be confused with the realized yield on a bond that has been held to maturity—or permanent default.

ments are to cease at the end of sixty years, the hypothetical yield must be less than $3\frac{1}{2}$ per cent per annum.⁶ If they are to cease at the end of 46 years, the yield must be less than 3 per cent per annum. If at the end of 35 years, the yield must be less than 2 per cent per annum. If they continue just 25 years, the yield will be exactly zero per cent per annum. With still shorter periods, the yields are negative.

If such an assumption were made as that the dividend payments were to increase in geometric progression, the future that could be neglected would be still more distant. One of the strangest rationalizations of unending price rise that appeared in the months immediately preceding the stock market culmination of 1929 was evolved by a Wall Street economist. He presented to the directors of the investment trust with which he was associated statistical evidence that the wealth of the country increased in the long run about 3 per cent per annum. He then argued that corporations as a class should be expected to share in this growth at this rate and hence that their dividends should be expected, over the long run, to increase at least 3 per cent per annum; that is to say in such a series as \$4.12, \$4.24, \$4.37, etc., or $\$4(1.03)$, $\$4(1.03)^2$, $\$4(1.03)^3$, etc. He then suggested that, with increasing financial stabilization of the country, these future dividends would eventually be discounted at a rate that would not exceed 3 per cent per annum. But, he continued, if distant enough payments were assumed, discounting them at this rate would give very high prices for the stocks. The suggestion was even made that, as there seemed to be no necessary time limit to the 3 per cent rate of growth in wealth, there should logically be no 'ceiling' whatever for stock prices.⁷ The phantasy

⁶ The present values of the future payments, discounted at $3\frac{1}{2}$ per cent per annum, are $\$ \frac{4}{1.035}$, $\$ \frac{4}{(1.035)^2}$, $\$ \frac{4}{(1.035)^3}$, etc. Now, from any ordinary compound interest and annuity table we may find that the sum of 60 terms of this series equals \$4(24.9447) or about \$99.78. Therefore, if the stock is selling at \$100, the yield is a little less than $3\frac{1}{2}$ per cent per annum.

⁷ If the dividends were $\$4(1.03)$, $\$4(1.03)^2$, $\$4(1.03)^3$, etc., as in the illustration of the text, and if these dividends were discounted at 3 per cent per annum, the price of a share of the stock that was to pay the dividends should be just four times the *number of payments* that were to be made; in other words, four times the *number of years* that the succession of dividends was to continue, even if nothing whatever was to be paid thereafter. The *present value* of each future dividend payment is \$4.

was strangely reminiscent of the Petersburg Paradox in the mathematical theory of probability.

On the other hand, it is of course true that, in pricing stocks, the market undoubtedly attempts to estimate their earnings and dividend probabilities for at least the near future. To the investor, past earnings and dividends, except in so far as they offer clues to the future, are mere 'water over the dam'. Dividing last year's dividends by the present selling price of a stock will produce a function that, for certain very restricted purposes, may be of some interest to the student of economic history and the business cycle; but it is highly undesirable to call the function a 'yield' and thus, by the use of terms, insidiously to suggest that it is of the same nature as the ('hypothetical') yield of a bond.

Though the terms of a bond's promise of future money payments change with the passage of time (as the maturity date approaches), they change in a slow and definite mathematical manner. Unless the time to maturity be very short, or the dates for which comparisons are made be very far apart, no great change in the yield of a bond can occur without a change in price. For short periods, the yield of a long term bond is virtually a function of *one* variable—the price of the bond. But the 'yield' of a stock is essentially a function of *two* variables. This difference is clearly apparent if we compare the 'yields' of stocks with the yields of perpetual bonds. The (hypothetical) yield per cent of Canadian Pacific debenture 4's (bonds that are perpetuities) will always necessarily be 400 divided by the price of a \$100 bond. But the 'yield' per cent of Canadian Pacific common stock, whether it be taken as (100 times) the preceding year's total dividends divided by the present price of the stock or as some more complicated expression, will always be essentially a function of *two* variables—a fluctuating price and a fluctuating dividend rate. Sudden and great changes in the calculated 'yields' of a stock occur not only because of changes in price but also because of changes in dividend rate.

To compute either bond yields or stock yields, assumptions must be made concerning future payments. The computer of stock yields usually assumes that payments in the future will be at the same annual rate as they were in the immediate past. Having made this totally unwarranted assumption, he plunges into refinements. If an 'extra' or unexpected dividend be paid, he labors like the mountain to decide

whether it is truly an 'extra' or should be considered as normal and 'regular'. If his decision whether it will or will not be regularly repeated turns out to be wrong, he 'revises' his preceding year's index of yields.⁸ And if the yields, as he calculates them, seem abnormally high or abnormally low, he tacitly suggests that future 'revisions' will probably correct his figures. He speaks of 'real' yields, meaning by the term what his yields will be when the future is known and all his 'revisions' completed. And all most seriously.⁹

The market's valuation of both second grade bonds and common stocks may, for the purpose of throwing light on our present problem, be thought of as though it were a process of consciously forecasting interest or dividend payments and then discounting them at some particular rate of interest.¹⁰ The (hypothetical) yield of a second grade bond is then high, not because the promised future interest payments are discounted at a high rate but because of the low degree of expectation that the payments that will actually be made will be as great as the promised payments. It is as though the expected future payments, which for a high grade bond are taken as identical or virtually identical with the promised payments, are for a second grade bond taken as only

⁸ One of the largest financial 'services' in the United States writes: "On occasional instances, a consistent handling of the situation is impractical and arbitrary decisions must be substituted. This may at times necessitate revising a part of the recent data."

⁹ Sometimes the 'yields' of stocks seem, to their computers, abnormally low or abnormally high on almost any of the various bases used for calculating them; for example, in September 1929. However, even at that time the fact that prices were unusually large multiples of immediately preceding dividends was accepted only as evidence and not as proof that 'real' yields were abnormally low. The mooted question was whether earnings could increase sufficiently in the future to carry such extremely high prices. If the immediate future of earnings had been known, it would undoubtedly have been generally realized that stock prices were relatively even higher than their 'yields' suggested. Dividends had been increasing, and the fall in 'yields' was therefore not as great as the rise in prices. If 'yields' could have been calculated on the basis of the dividends to be paid in the not too distant future instead of those paid in the immediate past, they would have fallen even more than prices rose.

¹⁰ What a business is earning is, of course, more fundamentally important than what it is currently paying. If a corporation be earning much more than it is paying out in dividends, the stock will tend to sell on a relatively low 'yield' basis. When conditions are reversed, the stock will tend to sell on a high 'yield' basis. The ratio of price per share to earnings per share is a function that has been calculated and presented in much the same manner as the stock 'yield' concept. It has almost all the technical drawbacks of the yields concept with the additional one that earnings are never as accurately known as dividends.

some proper fraction of what is promised. The yield of the second grade bond is high because of the difference between the expected and the promised payments. But in so far as the analogy can be carried through at all, the 'yield' of a common stock is high because of the difference between the expected payments and the rate at which payments have recently been made. But recent rates of payment, though they may in exceptional circumstances turn out to be the same as future rates, are not the same as and cannot be substituted for promises.

If such an illegitimate substitution be made, we are faced with the difficulty that, when the 'promises' are actually broken, the 'yield' will *fall* violently; and, even after adjustment to the new conditions, may be no higher than before the promises were broken. If, at the time that the dividend payments on a stock paying \$8 per annum are about to be cut to \$4 per annum, the stock be selling for \$100 a share, its yield will *fall* immediately after the cut—unless the price instantly declines to \$50 a share. And, unless the price falls *below* \$50 a share, the new 'yield' will be no higher than the 'yield' before the dividend cut. When dividends are completely eliminated, 'yields' immediately fall to zero. Though the 'yield' of a stock may have been, before the elimination of dividends, as high as the yields of very low grade bonds, after the elimination it becomes lower than the yields of bonds of even the very highest grade. It seems clear that, whatever else it may be, a (hypothetical) stock 'yield' is not an animal of the same species, or even genus, as a (hypothetical) bond yield.

Not only economists and statisticians but also investors and business men, when comparing the market's valuation of two bonds, tend to express that valuation in terms of the yields of the bonds rather than in terms of their conventional 'prices'. Though conventional 'price' is a price and the yield is only a function of a price, the price of which the yield is a function is, to the extent that there is warranty for 'the assumption of payment', a more expressive, enlightening, and pertinent price than the merely conventional price. Indeed, the conventional price of even a high grade bond is, *singly and by itself*, almost destitute of meaning. The quantity of the 'good' to which the dollars of the price are related is not adequately specified. The price is, by convention, the price per \$100 of 'face value'. But 'face value' tells us only the amount of the last payment. It says nothing about when that payment is to be made or about the amount and timing of other payments that are

to be made in the interim. And these facts are essential. As a unit of the good, \$100 of 'face value' not merely is inadequate but also may be completely meaningless. Its *reductio ad absurdum* occurs with perpetuities—in which 'face value' is not even promised.

It is true that the price of which the yield is most simply and directly expressible as a function is analogous to the price of money in terms of a commodity rather than the price of a commodity in terms of money. But this inverse relationship leads to no difficulties. To state that the yield of a bond is 5 per cent per annum is to state that the relation between the *conventional* price of the bond and the promised future payments is *as it would be* if a promised payment of \$105 due any time before maturity were worth \$100 payable one year earlier. As a corollary, we have the less general conclusion that the price which, minus unity, equals the yield of the bond is a price of a unit of *present* money in terms of promised money due one year hence.¹¹

For comparing the market's valuation of *two* bonds, conventional prices are, *by themselves*, quite useless. But they may give us some information if the comparison is between the market's valuation of a bond at one date and its valuation of *the same bond* at another date. No necessary conclusion can be drawn from the fact that, even on the same date, one bond sells for 90 and another bond for 110. But if, at one time, a bond sells for 90 and, at another time, for 110, we know at least that the yield was lower at the 110 price than it was at the 90 price. A change in yield must occur whenever a bond crosses par. Also, a change in yield must occur whenever, from an earlier to a later date, the plus or minus deviation of the price of a bond from par increases absolutely (not algebraically). And, if the bond be a perpetuity, we are not restricted to such vague and special non-quantitative conclusions.

Because the importance of the final or 'face value' payment decreases with an increase in time to maturity, comparison of the market's valuation of *two* bonds by means of their mere conventional prices (per \$100 of 'face value') reaches its *reductio ad absurdum*, as we have noticed, when there is to be no final payment, in other words when the bonds are perpetuities. However, if the comparison is of the market's valua-

¹¹ This is all, of course, 'as if'. Unless we make the arbitrary and unreal assumption of uniformity in the rates of discount used in each future compounding interval, yield must be considered a mere average (see Ch. II).

tion of a perpetuity at one date and its valuation of *the same perpetuity* at another date, conventional price tells exactly the same story as yield. If yield halves, price doubles, etc. The yield of a perpetuity is merely a constant multiple of the reciprocal of the conventional price of the perpetuity.

The advantage of knowing and using not only the conventional price but also this multiplier, in other words the advantage of using yield, when comparing the market's valuation of the same perpetuity at different times, is that the yield gives an indication of *grade* and the conventional price (by itself) gives none. Our discussion (Ch. IV) of the relation of movement of yield to yield itself (as an index of grade) would have been impossible in terms of mere conventional prices, even if all our bonds had been perpetuities. But conventional prices, though they would not have related movements to grades, would, if all the bonds had been perpetuities, have told us just as much about the movements themselves as did yields.

Strictly speaking, common stocks have no *grade* in the sense in which the term is used of bonds, the sense in which, other things being equal, highness of grade shows itself in lowness of yield. The 'grade' of a bond depends upon the capacity of the issuing corporation to fulfill the promises contained in the bond. Yield may be low and grade high because of the greatness of the corporation's capacity or because of the smallness of its promises. If the most senior issue of a corporation be small enough, the bonds may remain 'first grade' throughout a receivership. But common stocks are most commonly described as 'high grade' when their dividends have been large and regular or even increasing, and low grade when they have been nil, small and irregular or decreasing. The 'yield' of the stock has little or no relation to this concept of grade. Price is its real indicator. The poorest grade of common stocks will have the lowest 'yields'—namely zero; and the 'yields' of all common stocks will be related to the market's estimates of the rosiness of their dividend possibilities rather than to the degree of assurance with which those dividends can be forecast. A prospect of increasingly large dividends will lower the 'yield' of a common stock, but a bond whose coupons called not for uniform but for increasing payments would not, because of that fact, sell on a lower yield basis.

But, though common stocks cannot be classified as to grade in the same way that bonds can be, their place in the investment family, to

which bonds and preferred and common stocks all belong, may be described in terms of a concept that is at least related to the concept of bond grade. This concept is the concept of *priority*. If there be two bonds of the same corporation that differ only as to their *seniority*, the more senior bond will be of a higher 'grade' than the less senior, because its claim to payment will be *prior* to that of the less senior bond. And, if the corporation have preferred stock outstanding, that stock will (except in very unusual circumstances) be of a lower 'grade' than any of the corporation's bonds. In this sense, the common stock will be of a still lower grade. The claims of all the bonds will be *prior* to those of the preferred stock and the claims of the latter *prior* to the claims of the common stock.

Of course, such a classification by *priority*, embryonic as it is, is strictly possible only with the securities of a single corporation. But the fact that common stocks are junior to the other securities of their own corporations and hence, as a group, more uncertain as to their future payments than bonds suggests that the fluctuations in the valuations placed upon them by the market should be expected to be more like those of low grade than those of high grade bonds. And they are so. There are, of course, exceptions to this generalization. Some common stocks act more like high grade than really low grade bonds. But the generalization holds of common stocks *as a group*. Our future discussion therefore runs in terms of index members and not in terms of individual stocks. And the index numbers are, of course, index numbers of stock *prices*, and not index numbers of stock 'yields'. The concept of stock 'yield' is, as we have seen, quite useless for our purposes.

The stocks whose prices are used in this book are all American railroad stocks. Our decision to restrict ourselves to railroad stocks was not made merely because of the relationship between railroad stocks and railroad bonds. It is true that, in recent years industrial and public utility stocks have been relatively more important in the American speculative and investment markets than railroad stocks. But railroad stock prices present not merely a much more homogeneous but also a much longer series.¹² Our railroad stock price indexes go back monthly

¹² Cf. Wesley C. Mitchell, *Business Cycles*, pp. 170, 171:

"The number of industrial stocks regularly bought and sold on the market in every year since 1890 is too small to make significant averages."

While it would have been possible, from Boston quotations, to construct index

to January 1857—a period of seventy-nine years. Until about 1909 the railroad stock market was the American security market par excellence. Only in the last twenty years or so has its relative importance seriously declined.

We have not used the prices of preferred stocks. The number of railroad preferred stocks paying dividends regularly and having their prices quoted has always been so small as to prevent an index of their prices having any broad general significance. And, whether they paid dividends or not, it seemed undesirable to mix them with the common stocks.

The list of stocks used includes, at all times, virtually all the railroad common stocks whose prices were being regularly quoted on any of the great exchanges. The names of the railroads and the periods during which their stocks were used is graphically exhibited in Chart 32. Most of the changes in the list were made necessary or desirable by consolidations of one kind or another. For example, stocks No. 21 (New York Central) and No. 22 (Hudson River) were used from January 1857 to January 1870, and stock No. 23 (New York Central and Hudson River) from January 1870 to January 1936. However, if a stock became so inactive as to lack quotations for many months at a time, it was usually dropped from the list. In some instances stocks were not used while the railroad was in the hands of a receiver and undergoing reorganization. In a very few instances they were not used during a period in which exceptional circumstances only negligibly related to their investment values were violently disturbing their prices. Thus Northern Pacific was not used during the year of the corner (1901). Sometimes it was possible to bring a stock back into the list. For example, Northern Pacific was brought back in January 1906.

(Footnote ¹² concluded)

numbers of the prices of copper mining stocks or cotton mill stocks back as far as January 1857—the date we begin our railroad indexes—few persons would claim that such indexes would have anything approaching the general economic significance of an index of prices of the railroad stocks. And their relation to the yields of railroad bonds—which are the bonds we have used—would be difficult to interpret.

The monthly 'index of industrial stock prices' of the New York Federal Reserve Bank runs from January 1872 to date. But it is, in its early years, composed entirely of transportation, communication and mining stocks. The stocks used in 1872 were: Adams Express, American Express, Consolidated Coal, Delaware and Hudson Canal, Maryland Coal, Pacific Mail, Quicksilver Mining, Quicksilver Mining, pfd., United States Express, Wells Fargo Express, Western Union.

CHART 12

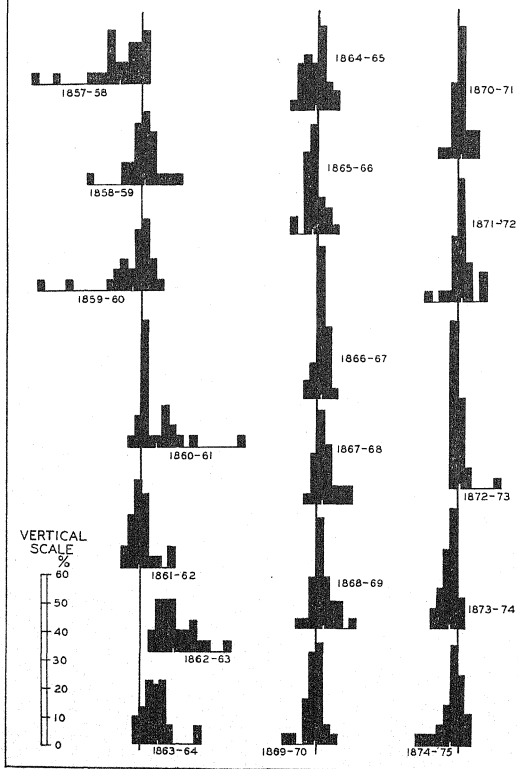
FREQUENCY DISTRIBUTIONS OF
RAILROAD STOCK PRICE RELATIVES

CHART 12-CONTINUED

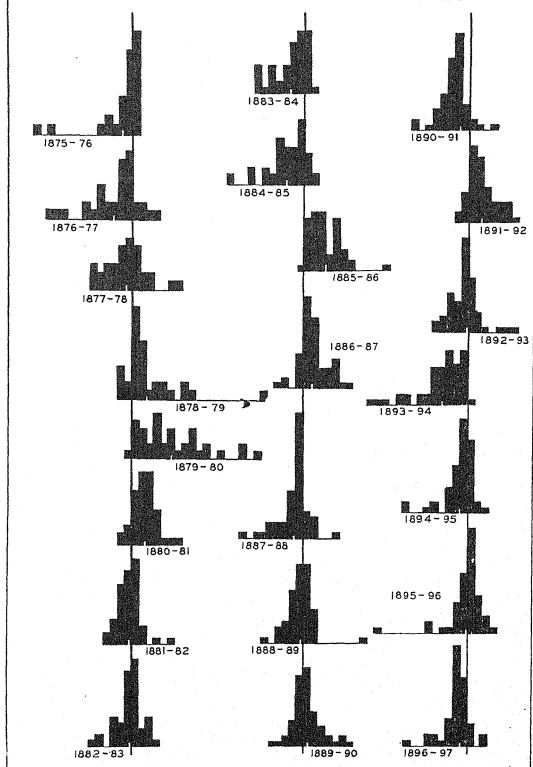
FREQUENCY DISTRIBUTIONS OF
RAILROAD STOCK PRICE RELATIVES

CHART 12-CONTINUED

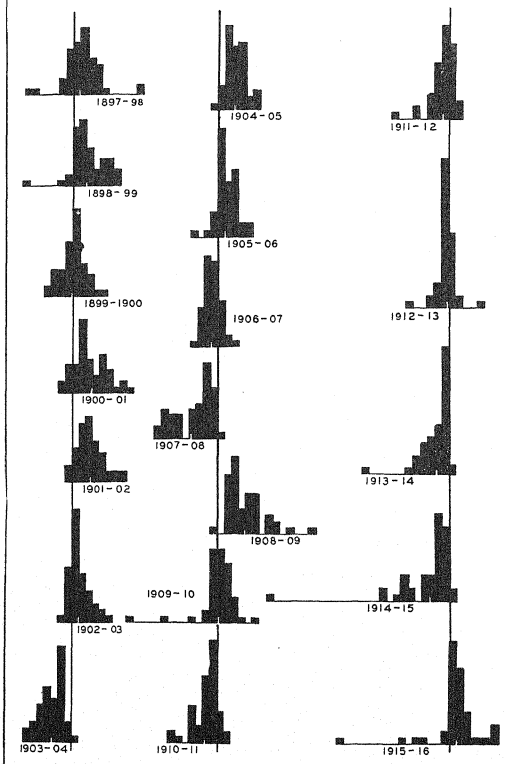
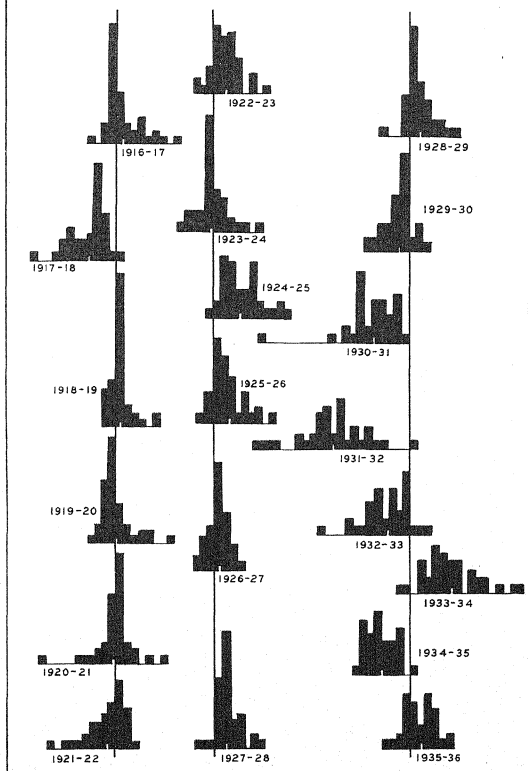
FREQUENCY DISTRIBUTIONS OF
RAILROAD STOCK PRICE RELATIVES

CHART 12-CONCLUDED

FREQUENCY DISTRIBUTIONS OF
RAILROAD STOCK PRICE RELATIVES

But, as may be seen from Chart 32, the instances in which a stock was dropped and later reinstated are few indeed.

Before discussing methods of measuring changes in the general level of railroad common stock prices, it is desirable to point out some characteristics of the price movements of the individual stocks. We must remember that, though their 'grades' may not be definitely measurable, the stocks are of different grades. Some are more speculative—less like high grade bonds—than others. Though all are 'common' stocks, they vary in their degrees of 'commonness'.

Appendix A, Table 14 gives the percentage that the price of each stock, in any particular January, was of the price of the same stock in the preceding January. Chart 12 presents 79 frequency distributions based on this table—one for each year from $\frac{\text{January 1858}}{\text{January 1857}}$ to $\frac{\text{January 1936}}{\text{January 1935}}$. This chart shows that most of these distributions are skewed in the direction of the general price change. In a year of rising prices they are skewed to the right; in a year of falling prices to the left.

The poorest stocks—those of the most overbonded roads—tend to show the greatest percentage price movements, both during periods of collapse and during periods of recovery. Now, though it is not logically necessary, the poorer stocks usually sell for fewer dollars *per share* than do the more conservative and less speculative stocks. The *lower priced* stocks, therefore, tend to show greater percentage fluctuations in price than do the higher priced stocks.¹³ But the relation does not exist merely because the lower priced stocks tend to be the lower grade stocks. It is partly psychological. Speculators seem to prefer to operate in relatively low priced stocks. If a sound and conservatively managed corporation, whose stock sells at a high price per share and shows only small per-

¹³ But their dollar or 'point' movements are generally *smaller* than those of the higher priced stocks. During a bull market, a stock that begins by selling for \$100 a share will probably rise in price a smaller percentage but a larger number of dollars or 'points' than will a stock that begins by selling for \$16 a share.

A curious empirical formula that describes the apparent tendency of price movement fairly well is that stock prices move equal increments on their square roots. Thus, if in a bull market stocks that sold for \$100 per share rise in price to about \$144 a share, stocks that sold for \$16 a share will tend to rise to about \$36 a share.

centage fluctuations, reduces greatly the market price of the stock per share by paying a large stock dividend, the new and lower priced stock will almost immediately begin to show larger percentage price fluctuations than did the old and higher priced stock.

From such strange material many types of index number could be constructed. The questions answered by some would be important, those answered by others would be trivial or even bizarre. Perhaps the first conclusion that one approaching the subject would come to would be that there was little if any importance attached to 'one share' as a unit of measurement. An index number based on totals of the prices of one share of each stock would be of the same type as an index number of commodity prices that was based on totals of the prices of one pound of each commodity. Any aggregate of actual prices calls for some weighting. The price movements of Pennsylvania stock are more important than the price movements of Western Maryland.

With almost no exceptions, the index numbers of stock prices that are currently published fall into one of three groups. All three are based upon arithmetic averages of actual prices. The first and largest group contains the 'unweighted' indexes. These are arithmetic averages of the prices of one share of each stock.¹⁴ The second group contains index numbers in which each stock is weighted by the number of shares outstanding. The monthly index numbers (see Appendix A, Table 10, column 6 and Table 17) presented in this chapter fall in this group (for weights, see Appendix A, Table 15).¹⁵ The third group contains index numbers in which the prices of the various stocks are weighted in proportion to their 'activity'—the number of shares that are bought and sold.¹⁶

The purpose of weighting is to make movements of the prices of the more 'important' stocks influence movements of the index num-

¹⁴ Often a set of weights is gradually introduced because of stock dividends. For example, the *New York Times* index of the prices of 25 industrial stocks is constructed by multiplying the present price of each stock by the number of shares that now correspond to one share at the time that the stock was introduced into the index. Though the divisor is still 25, the total number of shares is now much greater than 25.

¹⁵ As do the various weekly and monthly index numbers of stock prices published by the Standard Statistics Company of New York. Its index numbers extend back to January 1918.

¹⁶ Professors Irving Fisher and W. I. Crum have each published index numbers of stock prices weighted by activity.

bers more than do movements of the prices of the less important stocks—if possible, *in proportion* to their importance. The question becomes one of deciding what shall be meant by 'importance'? Important for what? From the standpoint of an individual holder, the 'important' stocks are those that he owns, and the *relative* importance of their (arithmetic) price movement is in the absence of other factors in proportion to the number of shares that he owns of each. But all shares outstanding are owned by someone. May not the relative *social* importance of (arithmetic) fluctuations in the price per share of the stock of a particular corporation, therefore, well be thought of as a function of the number of shares that the corporation has outstanding; and, in the absence of the disturbing effects of other independent variables such as the extent to which the stock of the corporation is used as collateral for loans, etc., may not the relative social importance of (arithmetic) fluctuations in the price well be thought of as *varying directly* with the number of shares outstanding?

It is of course true that, if the price at which a share of stock is sold be multiplied by the total number of shares outstanding, the resulting figure may easily be quite unrepresentative of any intelligent valuation of the entire enterprise. Dr. Wesley C. Mitchell drew attention to this fact in his *Business Cycles* (p. 171):

"Whether the market prices of stocks in 100-share lots may be interpreted as showing accurately changes in the prices of the business enterprises concerned is highly questionable. If 1,000 shares in a railway which has 100,000 shares outstanding be sold at \$80 per share on a given day, it does not necessarily follow that the whole proprietary interest could be sold (or bought) for \$8,000,000. Indeed, it is seldom safe to infer the price for the total supply of any kind of goods from the current market price per unit . . . that cannot be known except in the rare cases when such sales are actually made and the terms published. Hence we must content ourselves with taking the figures for what they are—prices of *shares* in business enterprises."

We must remember, however, when considering the above remarks of Dr. Mitchell, that, though a multiplication of price per share by total number of shares outstanding does not necessarily show what "the whole proprietary interest could be sold (or bought) for", it does determine the valuation that will be put on each and every one of the separate parts or 'shares' of the proprietary interest by the individual

owners of those parts and by their creditors—such as banks. Loans are made and are called on the basis of the market prices per share of the collateral behind the loans.

For most economic purposes the 'importance' of the market price of a share of the stock of a corporation depends upon the number of shares outstanding. The economic importance of two shares of stock is not necessarily greater because they represent interests in two corporations than it would be if they represented an interest in only one corporation. To weight prices per share by the number of shares outstanding would seem a simple and logical way of allowing each separate *individual* share an importance not dependent upon the size of the corporation to which it belongs. If prices are not weighted by the number of shares outstanding, the prices of the shares of small corporations are given an importance they do not merit. If Corporation A has 1,000,000 shares outstanding and Corporation B only 100,000, a five dollar rise in the price *per share* of the stock of Corporation A tends to be ten times as important as a five dollar rise in the price *per share* of the stock of Corporation B. The price of each separate share in Corporation A is, we may assume, as important as the price of each separate share in Corporation B, and there are ten times as many of them.

The usefulness of index numbers of stock prices in which the prices of the various stocks are weighted in proportion to their market activity is very restricted. For some theoretical purposes connected with the 'equation of exchange' and for some practical purposes connected with the forecasting of stock prices by watching changes in the internal 'technical' condition of the market, the relative 'importance' of the prices of stocks may be thought of as varying directly with the number of shares sold. During a period in which a speculative football, such as Auburn Motors once was, is traded in much more actively than the stock of a much larger and economically more important company, such as General Motors, there is a sense in which fluctuations in the price of Auburn are more 'important' than fluctuations in the price of General Motors. But it is a narrow and technical sense.¹⁷

Index numbers of stock prices that are weighted by 'activity' are sub-

¹⁷ Of course, when a stock becomes extremely inactive (*or abnormally active*), its price may become a much less reliable measure of careful and significant valuation by the market than it would be in more normal circumstances. But this is a matter that concerns the adequacy of the pricing process and not the importance of the commodity.

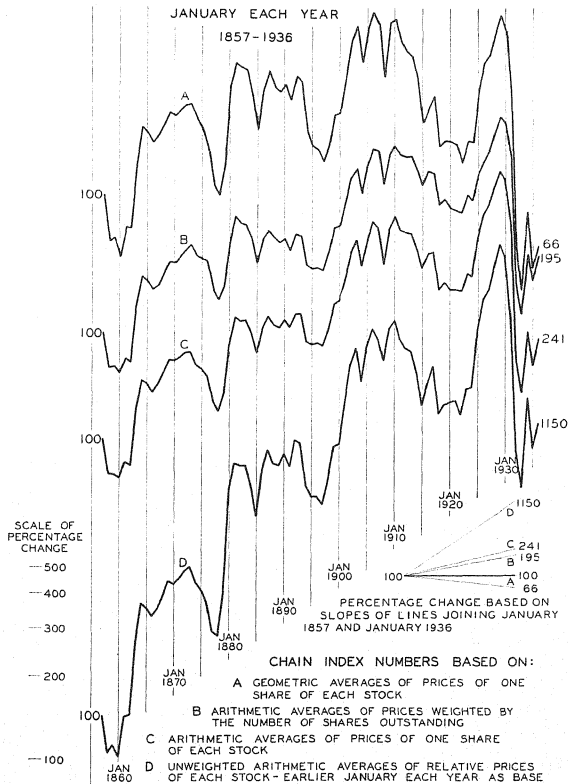
ject to a quasi mathematical drift. In periods of advancing prices there is a pronounced tendency for individual stocks to be abnormally active when they are advancing in price more rapidly than the general market. The opposite tendency—to be abnormally active when they are declining more rapidly than the general market during a period of general decline—is very much less pronounced. The reasons for these conditions are partly technical and partly economic; but, if individual prices are weighted in proportion to the changing turnover of the individual stocks, the net mathematical result is a pronounced upward drift in the index number during rising markets, accompanied by a much less pronounced downward drift during falling markets. If a stock moves from 100 to 120 during a short period of great activity (compared with the activity of other stocks) and falls back to 100 during a long period of relatively small activity, it affects the index number more while rising than it does while falling. It is theoretically possible for the price of each stock in the index number to be the same at the end of a period as it was at the beginning, and yet the index number show a pronounced movement.

All existing index numbers of the prices of common stocks contain 'economic drift'. This is not merely almost inevitable but also desirable and necessary if the indexes are to present faithful pictures of what actually occurs. Economic drift is the essential characteristic of the movements of common stock prices. Those prices are the prices of radically junior securities and economic drift is the very badge of their 'juniority'. To eliminate it from an index, if that were feasible, would be nothing short of emasculating the index.

But *mathematical* drift is a merely disturbing influence, whether it occurs in a pure or in a disguised and quasi form. Charts 3 and 4 were introduced to illustrate types of mathematical drift in index numbers of bond yields. Chart 13 performs a similar service for stock prices. Four index numbers of railroad stock prices are there shown.¹⁸ Each index is a 'chain' number, constructed by chaining together 79 separate index numbers, each extending from one January to the next. The indexes presented by the upper three lines on the chart (A, B and C) vary greatly in their movements, but are free from purely mathematical drift. The index represented by the lowest line on the chart (D) is subject to violent mathematical drift.

¹⁸ For the figures, see Table 16.

CHART 13 INDEX NUMBERS OF THE PRICES OF AMERICAN RAILROAD STOCKS



Indexes A, B and C are each based on averages of actual prices. The differences in their movements result from differences in the types of average used and from differences in weighting. The averages of index A are geometric, those of B and C arithmetic. The individual prices of A and C are unweighted, those of B are weighted each year by the number of shares outstanding.

From January 1857 to January 1936 index A shows a *fall* of 34 per cent, index C a *rise* of 141 per cent, but this drift apart is not a purely mathematical drift in the sense in which we have been using the term. It is not, for example, a drift whose direction could be predicted for unknown chance material. Neither the figures of index A nor the figures of index C would be changed if the time order of the data were reversed. If the 1936 prices of individual stocks had occurred in 1857, the 1857 prices in 1936, and the prices of the intervening years had been correspondingly reversed as to time order, index A would have advanced from 66 to 100 instead of declining from 100 to 66, and index C would have declined from 241 to 100 instead of advancing from 100 to 241.

In the absence of substitutions, any quasi mathematical drift found in the relation between geometric and arithmetic indexes occurs primarily because of differences in the *economic drifts of the individual prices*. It could not, of course, occur if it were not for a difference in the mathematical treatment of the data; but its direction and very existence depend, at all times, on differences in the *individual drifts*, and whenever these individual drifts are large and important, they are of economic rather than chance origin.

The ratio of the arithmetic average of n positive quantities to the geometric average of the same quantities equals $\frac{1}{n}$ -th of the sum (i.e., the arithmetic average) of the ratios of the individual quantities to the geometric average.¹⁹ The product and hence the geometric average

¹⁹ Let A represent the arithmetic average and G the geometric average. Then the n individual quantities may be represented by $Gx_1, Gx_2, Gx_3, \dots, Gx_n$ where each x represents the ratio of a particular individual quantity to the geometric average. Now A , the arithmetic average of the n quantities, of course equals $G(x_1 + x_2 + x_3 + \dots + x_n)$.

Hence the ratio of the arithmetic average to the

of these individual ratios necessarily equals unity, but their arithmetic average varies with and constitutes a species of measure of the 'scatter' of the original quantities. With both stock prices and bond prices (in the sense of the reciprocals of their yields), this scatter tends to decrease with the passage of time; though it sometimes increases for fairly long periods. But, whether it decreases or increases depends upon economic characteristics of the data rather than upon mathematical characteristics of the index numbers.

The economic characteristics of stock price data are such that changes and substitutions among the stocks tend to affect index A much more seriously than they do index C. Stocks may be removed from an index because the road has gone into bankruptcy; they are never removed (if sales continue to be regularly made) because of the excessive prosperity of the corporation. Now index A is much more affected by a specified percentage change in the price of a low priced stock than is index C. And the percentage changes of really low priced stocks are, or at least have been (on the way down), gigantic.

The effect on index A of carrying a stock into bankruptcy and then removing it from the index may be almost impossible ever to overcome, though the effect on index C be relatively small. If, in the final year that a stock was in the indexes, its price began the year at 4 and ended it at 1, the effect on index A would be no more than merely offset by a later rise in the price of another stock from 25 to 100. And, even if the low priced stock was not removed from the index but was carried through a reorganization of the road, the mere process of reorganization would render improbable a percentage recovery in the new stock sufficiently great to offset a previous decline of the old stock into the region of zero.

Stock prices are unlike commodity prices in that commodity prices, as handled by the maker of index numbers, are the prices of new and not of second-hand or worn-out commodities. Cost of production prevents the prices of new commodities dropping to zero, or even close to zero, and *remaining there*. Though an index based on unweighted geometric averages fulfills the 'circular test' and, in that sense, has no strictly mathematical drift, it develops a quasi mathematical drift when

(Footnote ¹⁹ concluded)

$$\text{geometric average, or } \frac{A}{G} \text{ equals } \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

it is constructed from data, such as stock prices, in which the size of the *ratio* fluctuations tends to increase as the price declines, approaching infinity as zero prices are approached, and in which there exists the very real possibility of permanently zero prices.

It is of general and fundamental importance to realize that the applicability, to any specific data, of no type of averaging or weighing can be determined *a priori*—by mere mathematical analysis—without considering the characteristics of the data and the purposes of the averaging. This view of the subject takes 'averaging' out of the vacuum in which it is so often discussed.

Even the index number represented by the lowest line (D) of Chart 13, subject as it is to the most violent mathematical drift, is perfectly adapted to answer certain practical questions. It is exactly the index number required to measure the changing fortune of an investor who began, in any January, by investing *equal amounts of money* in each stock and, in each following January, rearranged his portfolio so that once again the market values of his individual holdings would be identical.

To the extent that index numbers based upon arithmetic averages of 'relatives' tend to show a definite upward drift even if constructed from mere chance data, their drift is purely mathematical. But the drift in index D is greater than would occur with chance data. This is largely the result of the fact that, during the four greatest upward surges of the railroad stock market, the lower priced and more speculative stocks enjoyed a much greater percentage advance than did the higher priced and more conservative stocks. And the lower the price of the stock the greater the number of shares used in index D. As the price advances the number of shares is reduced, new low priced stocks receiving the excessive weighting.

But, for the purpose of comparing the movements of stock prices with the movements of bond yields, this quasi mathematical element in the drift is as disturbing as is the purely mathematical element. It is as undesirable to overweight low priced stocks as it would be to overweight high priced stocks. We are even less interested in how an individual investor would have fared if he had always kept an equal amount of money invested in each security than how he would have fared had he always held the same number of shares of each security. Our problem is a social and not a merely individualistic one. We are concerned

with railroad common stocks as a type of security. We are therefore interested in what happened to railroad common stockholders as a class, but not in what would have happened to an individual if he had played the market in this way or that. We are interested in the changing value of the entire railroad system of the country—in so far as market prices can be used to measure changes in that value—rather than in changes in the price of arbitrary and insignificant or fluctuating and misleading units.

And, for such a purpose, there is only one index number. Indeed, were it not for changes in the number of shares outstanding and for the occurrence of amalgamations, consolidations and reorganizations with the attendant necessity of substitutions and changes in the list of stocks used, no question would ever arise. The price per share of each stock would, without discussion, be multiplied by the number of shares outstanding in order to obtain a figure for the total 'equity' value of each corporation—its worth to its stockholders. And these totals would then be added together. But, with not only changes in number of shares outstanding but also changes in capital structure that alter or even destroy the significance of the price of 'one share', 'chain' index numbers become absolutely necessary. Index B of Chart 13 is such a number.

The movements of index B are naturally more like those of index C than they are like those of index D. There is always some tendency for the stocks of the larger roads to be more conservative investments and therefore less violent in their price movements than the stocks of the smaller roads. Index B gives the greatest weight to the prices per share of the larger roads. It weights the various stocks in proportion to number of shares outstanding. Index C reduces this logical and desirable disparity of weighting by using only one share of each road. The larger roads receive no more weight than do the smaller. But index D goes so much further in this direction that it tends to introduce a system of *inverse* weighting. In so far as the stocks of the large roads are conservative and high priced and the stocks of the small roads speculative and low priced, the system of weighting is a complete reversal of common sense. The large companies are weighted the least heavily, the small companies the most heavily.

Index B is the only stock price index for which we present monthly figures. In the calculation of each link in the chain number (from one January to the next), prices were adjusted for all stock dividends,

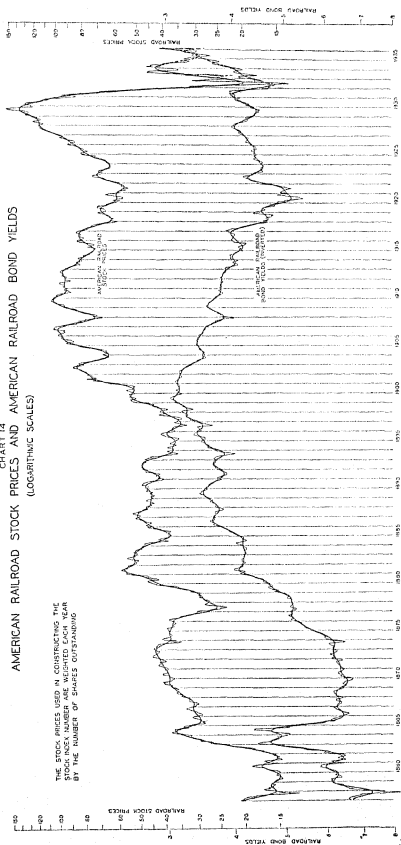
rights, etc., that occurred during the thirteen months. After this had been done, the adjusted prices per share were multiplied by the number of shares outstanding in the earlier January. We used total number of shares *outstanding* rather than number of shares in the hands of investors other than railroads. The difference in the two types of index numbers would undoubtedly be microscopic, and the calculation of the weights, under the non-railroad investor assumption, would have been a piece of foolish labor.

Even if there were good reasons for eliminating all intercompany holdings when determining weights, it would mean only that our index tended to weight slightly more heavily than it should—but not in any such extreme manner as ‘one share each’ indexes—the stocks of the smaller roads. Little railroads do not hold the stocks of big ones to anything like the extent that big roads hold the stocks of little ones. Railroads much more usually buy stocks for control or for a voice in the management than they do for a mere share in the profits with other investors.

Chart 14 presents the monthly movements of the railroad stock price index number, in which the prices of the individual stocks are weighted by the number of shares outstanding, and also the monthly movements of the ‘adjusted’ index number of the yields of high grade railroad bonds. The bond yield index is inverted and its scale is double that of the stock price index. As both scales are logarithmic, an upward movement of the bond yield index resulting from a *halving* of yields would, therefore, be of the same size as an upward movement of the stock index resulting from a *quadrupling* of prices.

It is at once apparent that the dissimilarities of the major movements of the two lines are much more striking than the similarities. The major long term movements of the bond yield line (*inverted* yields) are: (1) the irregular but violent up-swing from 1857 into 1864, followed by the short but violent down-swing into 1866; (2) the great upward swing from 1869 into 1899; (3) the great downward swing from 1899 to 1920; (4) the great, though extremely irregular, upward swing from 1920 to the date of writing. There was a fair degree of similarity between the *trend* movement of stock prices and the *trend* movement of the reciprocals of bond yields (as in the inverted line of Chart 14) from 1857 to 1864. There was, however, in railroad stock prices, no comparable movement to the violent down-swing of the bond yield recipro-

CHART 14
AMERICAN RAILROAD STOCK PRICES AND AMERICAN RAILROAD BOND YIELDS
(LOGARITHMIC SCALES)



cals into 1866. During the great swing of the bond yield index from a high of 6.72 per cent in December 1869 to a low of 3.07 per cent in June 1899, stock prices were see-sawing up and down on a plateau. There was a drop definitely below the plateau into 1877 and a recovery definitely above the plateau into 1881, but in December 1869 the stock price index number stood at 37.52 and as late as June 1897 at no more than 36.45.²⁰ During the first ten years of the great downward swing of the bond yield line from 1899 to 1920, stock prices doubled (from 51.14 in June 1899 to 105.83 in August 1909). It is true that the two lines move down together from 1909 to 1920 and up together from 1921 to 1927, and that, in the recovery after 1932, the major trends of both lines are upward. But the movements of the bond yield line, during the great 1929-32 collapse in stock prices, are little more than mere irregularities. There is no real similarity between the long term trends of the two series.

The 'cyclical' movements of the two series are much more closely related than are the long term trends. Lines D and E of Chart 21 represent the *deviations* of the bond yield and stock price mathematical graduations (presented, with the data, in Chart 14) from cycle-eliminating mathematical trends. Though there appear serious variations in the lags and even, at times, extra 'cycles' in one or other of these two deviations lines, there is, over the whole period, a real and rather striking similarity between them.

But the reader must remember that the disturbing effects of the dissimilarities of the long term trends do not exist in these deviations series. The short swings of the data, *as they actually occur*, show a much less uniform similarity between the two series than do the deviations. And even the similarity between the two sets of deviations is, as we have said, by no means uniformly close. The elimination of long term trend creates maxima and minima in the deviations series that do not exist in the original series. The deviations curve tends to pass through the zero line where mere points of inflection occur in the original series. For example, the stock price collapse that began in 1876 is accompanied by only a levelling off of the movement of the bond yield line of Chart 14. But in Chart 21 the deviations lines are strikingly similar in their movements through 1873, '74, '75, and '76. Simi-

²⁰ For the figures from which Chart 14 was constructed see columns 5 and 6 of Table 10.

larly, the stock price rise into the sharp peak of 1902 is accompanied by a *fall* in the (inverted) bond yield line of Chart 14. The stock price collapse of the next year (1903) is accompanied, not by a reversal of direction after a rise, but only by an increased rate of decline of the (inverted) bond yield line of Chart 14. But, in Chart 21, the two series each show a definite minimum ²¹ in 1902.

In exceptional instances, the deviations curves of Chart 21 require very careful interpretation if they are not to be misleading. And, in at least one instance—when they suggest a stock price maximum (*minimum* on the inverted deviations line of Chart 21) *at the end of 1930*—one naturally feels that the mathematical rigidity of the 'cycle-eliminating' trend curve has introduced a palpable absurdity into the data. The collapse of (raw) stock prices that began in the autumn of 1929 was so sudden and the downward movement so precipitate and long-continued that the trend curve, in its efforts (if we may be permitted to use such an expression) to handle 1930, 1931 and 1932, turned down even more steeply than the seasonal-eliminating graduation of the data.

That the short term or cyclical movements of stock prices and bond prices (as reciprocals of yields) should be more alike than the long term trends, if not as to the amplitude at least as to the timing of the movements, is as one would expect. The down swing of the economic cycle is a period in which the general demand is not primarily for more secure investments, but for more cash. It is a period of 'liquidation'—a period in which an extraordinarily large percentage of debtors are being forced to pay off or reduce their debts, a period in which they are attempting to sell rather than merely to improve the grade of the securities in their portfolios. A reverse process goes on during recovery. As the community emerges from the vicious circle of compulsory debt payment or bankruptcy, with its inevitably depressing effects on potential investors who fear further declines, *all* types of security soon tend to advance.

The cyclical fluctuations of common stock prices are greater than the cyclical fluctuations of the prices of high grade bonds not merely because the expectation of future payment from the stocks fluctuates while that from the high grade bonds remains virtually constant but also because the stocks are, to a much greater extent than are bonds,

²¹ *Stock prices*, but not bond yields, are inverted in Chart 21.

carried on loans. But the cyclical movements of the two types of security have essentially the same relation to the business cycle, the cycle of confidence, the cycle of debt contraction and debt expansion.²²

But there are no such simple reasons for expecting the *long term trends* of the two series to be similar. The compulsory liquidation on the cyclical decline and the plethora of funds for investment on the cyclical advance are each, in a sense, reactions from conditions that had become, both economically and psychologically, thoroughly extreme. A cyclical decline in stock prices is primarily a result of pressure rather than of a change in anticipated earnings—important as such a change may be. But this is not true of long continued movements of stock prices. Those movements are primarily the result of changes in anticipated earnings. But the prices of high grade bonds move with stock prices in business cycles, not because of the earnings factor but because of the pressure factor. For a changing list of bonds that are always of superlative grade, changes in the earnings factor may be assumed to be negligible.

And finally, the demonstration that the long term trends of the two series should not be expected to be necessarily the same may be put into the form of a *reductio ad absurdum*. If we assume that the long term movements of the prices (or yields) of bonds of superlative grade are much the same whether the bonds be railroad, industrial or public utility bonds, we realize that there is no inherent reason why the prices of superlative *railroad* bonds should not move up and down on their long time trends with the prices of industrial or public utility stocks *as closely as with the prices of railroad stocks*. But, while the cyclical movements of the three types of *stock* have usually been timed almost the same, their long term trends have often been quite different. For example, while railroad stock prices were declining from 1909 to 1920, the secular trend of industrial stock prices was definitely upward, from 1910 to 1919 strongly so.

Of course, if we were to compare stock price movements with the movements of the prices of *low grade* long term bonds, we should expect to find a greater similarity than if the comparison were with bonds of superlative grade. But the increase in similarity, though definite, would not necessarily be great. We must remember that a bond, with

²² It is because it is a cycle of *confidence* that the movements of stock prices tend to lag behind those of bonds.

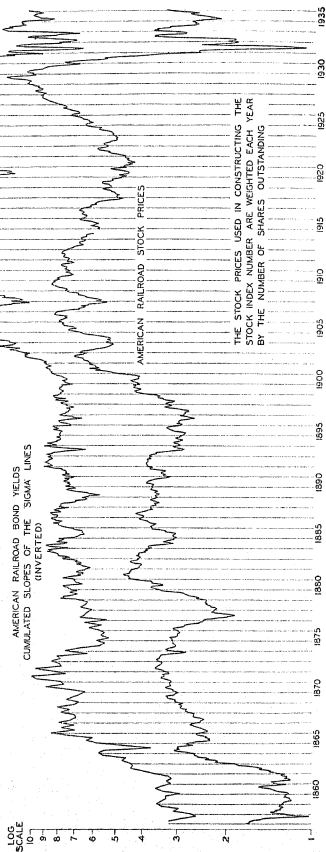
its maximum possible return, should be expected to act quite like a common stock only if that maximum return were so far above both the actual and the expected returns as to constitute no real 'damper' on upward movements. But the problems presented by bonds that are making no 'interest' payments or at best only reduced payments are, unless the bonds be income bonds, entirely different from those of common stocks. For example, the absence of dividend payments does not evoke the spectre of bankruptcy.

If, however, instead of collecting prices for a number of extremely low grade bonds—whose 'lowness' of grade would be undetermined—and comparing the movements of their prices (or yields?) with the movements of stock prices, we compare the movements of stock prices with a cumulation of the grade 'factor' given by the *slopes* of the 'sigma' lines, the results are rather interesting.

Chart 15 presents such a comparison. The reader will remember that, when the 'slope' of a sigma line is less than unity, the higher yield lower grade or in general more 'junior' bonds are acting better than the lower yield, higher grade bonds. They are either decreasing in yield more rapidly or increasing in yield less rapidly than the higher grade bonds or, in exceptional instances, decreasing in yield while the lower yield bonds are increasing. Also, the reader will remember that the mathematical equations represented by the sigma lines are of such a nature that, if the product of the slopes of consecutive sigma lines be cumulated, the result (in the absence of substitutions) will be the slope of the sigma line relating *directly* the yields of the bonds at the earliest and latest dates. Assuming the slopes of the sigma lines to be indexes of the degree of improvement or decline in railroad prosperity, or, more accurately, indexes of improvement or decline in the market's valuation of junior securities when compared with senior securities, we naturally feel that a comparison of stock prices with a cumulation of the sigma 'slopes' would surely be interesting.

The most cursory comparison of Charts 14 and 15 will convince anyone that, as we should expect, the *major* movements of stock prices follow much more closely and consistently the major movements of the cumulated sigma slopes (Chart 15) than they do the major movements of the yields of high grade bonds (Chart 14). But the short term movements of stock prices, whether separated from their long term trend as in Chart 21 or unseparated as in Chart 14, are more like the corre-

CHART IS
AMERICAN RAILROAD STOCK PRICES AND A CUMULATED PRODUCT OF THE SLOPES
OF THE 'SIGMA' LINES FITTED TO THE YIELDS OF AMERICAN RAILROAD BONDS



sponding short term movements of the (inverted) yields than they are like the short term movements of the cumulated sigma slopes (Chart 15).

Of course, this appearance of similarity in the major movements of railroad common stock prices and the cumulated sigma slopes of the bond yields and its frequent absence in the merely cyclical movements of the two series may both, to some extent, be statistical accidents. Though our index of railroad stock prices is an almost all inclusive index and is, for most purposes, logically weighted, it is theoretically perhaps, for the purposes of our present comparisons, too all inclusive and not quite logically weighted. Though the movements of the yields of railroad bonds of the highest grade should theoretically be virtually as closely correlated with the course of industrial stock prices as with the course of railroad stock prices—if either correlation were logically called for—the sigma lines derived from the movements of the yields of railroad bonds of *various grades* have no such necessary relation to the prices of industrial stocks as they have to the prices of railroad stocks. And, to carry the argument one step further, no such necessary relation to the prices of railroad stocks in general as they should be expected to have to the prices of the stocks of *those particular railroads whose bonds were used in obtaining the sigma equations*.

There are both practical and theoretical difficulties that make the construction of a stock price index number that would be more logically adapted to our immediate problem extremely difficult; and the general usefulness of such an index would be much less than that of the one we present. Whether it would increase or decrease the similarity of movement of the two lines presented in Chart 14 is hard to say.

For we must remember that the other function—the cumulated sigma slopes—is also anything but perfect from either a theoretical or a statistical standpoint. For example, the absence from the cumulated sigma slopes of a dip in 1903 and a recovery in 1904 is definitely explained by Chart 8 on which the non-linearity of the scatter outside the range of the bonds we used from January 1903 to January 1904 is clearly shown. The slope of the asymptote of the hyperbola that extends into the region of high yields is definitely greater than unity while the slope of the sigma line is less than unity.

And finally, though it would have been interesting and enlightening, if we had had the ability to do so, to have presented such functions of

stock prices and of bond yields and bond yield 'drift' as would have furnished an almost perfect correlation between the series, it would have been interesting as evidence only of the nature of the relationship, not of its existence. Chart 15 must be thought of as a test of how adequately the sigma system can represent a relationship that, from *a priori* considerations, may be assumed to exist, rather than as a demonstration of the existence of such a relationship.

CHAPTER VI

INTEREST RATES AND COMMODITY PRICES

THE statistical study of time series has presented few more puzzling problems to the economist than those concerned with the relations between interest rates and commodity prices. The apparently high correlation between the movements of bond yields and the movements of commodity prices has been accepted, not merely by the man on the street but also by many professional economists, as virtually conclusive evidence that interest rates and commodity prices must be causally related in some extremely direct if not extremely simple manner. But the prevalence of this conclusion has resulted more from the aggressive assurance of a few hierophants than from a careful examination and consideration by their disciples of either the data themselves or the treatment of the problem by the masters.

The complete assurance that a persistent similarity between the movements of bond yields and the movements of commodity prices is so well established as to call loudly for explanation is typically expressed by John Maynard Keynes in his *Treatise on Money*. Mr. Keynes, after drawing attention to "the extraordinarily close correlation over a period of more than a hundred years between the rate of interest, as measured by the yield of Consols, and the level of prices, as measured by the Wholesale Index-Number", goes on to add that this correlation "is one of the most completely established empirical facts within the whole field of quantitative economics" and concludes that "it is very unlikely indeed that it can be fortuitous, and it ought, therefore, to be susceptible of some explanation of a general character".¹

¹ II, 198. The reader should be very careful that he does not give more weight than should be given to the expression "over a period of more than a hundred years" in the above quotation. A high correlation between two long extended series is an index of the closeness with which the two series can be expressed in terms of one another by a particular mathematical equation, usually a straight line with two defi-

As illustrations of how the relationship has been or can be demonstrated, Mr. Keynes presents first a table comparing 'adjusted' commodity prices with the yield of Consols by five-year periods from 1791 to 1919 and annually from 1920 to 1928.² The 'adjustments' consist in increasing by 10 per cent the commodity-price figures for 1791-99, 1820-54, 1875-84 and 1926-28, by increasing by 20 per cent the figures for 1885-1914, and *decreasing* by 20 per cent the figures for 1915-20. Mr. Keynes describes these 'adjustments' as "dampening down the more violent movements" of the price series.³

Leaving the 'adjustments' with the statement that, "whilst making matters clearer to the eye", they are "not, however, at all necessary to establish the correlation", Mr. Keynes proceeds to introduce some of the statistical work of W. H. Coates and E. G. Peake. Mr. Coates, comparing annual figures for the yield of Consols with annual figures for the *Statist* index of British commodity prices, had found⁴ that "the Pearsonian coefficient of correlation" between the raw annual figures for the two series was, for the period 1825-1924, $+0.893 \pm 0.014$ and, if the yields of Consols were lagged one year, $+0.903 \pm 0.012$. Mr. Peake had found, for the years 1882-1913, high coefficients of correlation between the *Statist* price index number and the yields of London and Northwestern Railway Debenture Stock ($r = +0.880$ without lagging and $+0.888$ when the yield was lagged one year). He had also found lower but still relatively high coefficients between the commodity price series and short term money rates during the same period. Without lagging, the comparison with the average annual rate on 'floating money' gave $r = +0.801$ and the comparison with the discount rate on three months' bank bills gave $r = +0.724$. In each instance, lagging decreased the coefficients.⁵

In his popular summary of the movements of commodity prices and

(Footnote¹ concluded)

nite constants. Now such a high correlation gives no proof that the series can be as adequately expressed in terms of one another in their successive parts *by the same equation*—which the expression "over a period of more than a hundred years" might lead the careless reader unconsciously to assume.

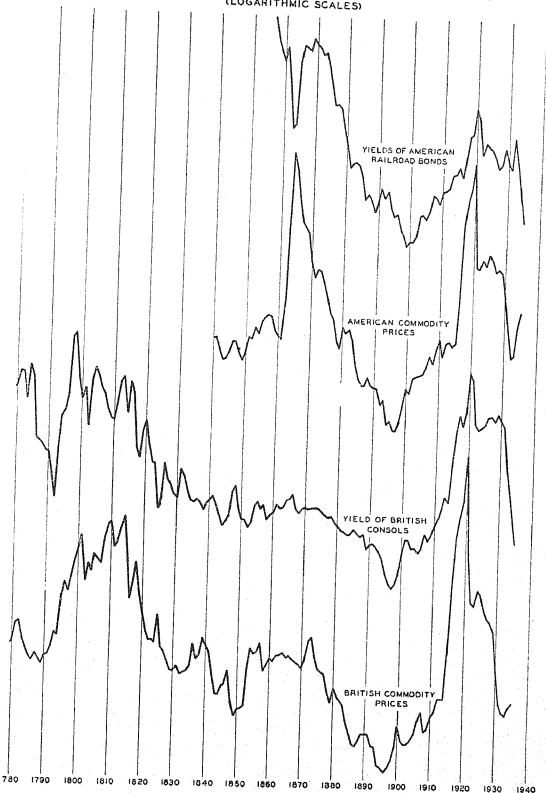
² *Ibid.*, p. 199.

³ *Ibid.*, p. 200. Considerable insight into the nature of these 'adjustments' may be obtained by examining Chart 16 on which are presented annual data for (unadjusted) British commodity prices and the yields of Consols.

⁴ See Colwyn Report on National Debt and Taxation, Appendix XI, p. 101.

⁵ J. M. Keynes, *Treatise on Money*, II, 202.

CHART 16-BOND YIELDS AND COMMODITY PRICES
(LOGARITHMIC SCALES)



the yields of British Consols, Mr. Keynes writes: "The broad character of the statistics since 1820 can be summarized as follows. Prices and Interest fell together from 1820 to 1850, rose together from 1851 to 1856, fell together in 1857-58, rose together from 1858 to 1864, fell together from 1866 to 1869, fell together from 1873 to 1896, rose together from 1896 to 1900, fell together from 1901 to 1903, rose together from 1905 to 1907, fell together in 1907-08, rose together from 1908 to 1914 and 1914 to 1920, and fell together from 1920 to 1923. And over and above these general trends, a number of the minor oscillations of the two are in the same direction."⁷

⁶ *Ibid.*, p. 201.

⁷ *Ibid.*, p. 201.

The numbers of years in "these general trends" (in which the years 1865, 1870, 1871, 1872 and 1904 do not appear) are 31, 6, 2, 7, 4, 24, 5, 3, 3, 2, (7, 7), 4.

The 31-year period from 1820 to 1850 shows a very considerable dissimilarity in the 'minor oscillations' of the two series. But the trend of each series is undoubtedly downward throughout the period (see Chart 16). And the declines from the earliest to the latest year are almost identical. Prices (on the Sauerbeck-Statist index used by Mr. Keynes) were 31 per cent and the yield of Consols 30 per cent lower in 1850 than in 1820. The 31-year period is the period covered by the first of the "general trends".

But, in the 25-year period from the price minimum year 1849 to the price maximum year 1873 the two series show no such similarity of long term trend. The Sauerbeck-Statist index for 1873 is 148 per cent of the 1849 figure, but the average yield of Consols was, in 1873, the same as in 1849. It is true that the yield of the high-yield year 1866 was 13 per cent higher than that of the low-yield year 1852; but 1852 is three years *later* than the price-minimum year 1849, and 1866 seven years *earlier* than the price-maximum year 1873. Mr. Keynes does not present the 25-year period 1849-73 as the period of one of the "general trends". He breaks it up into no less than four 'general-trend' periods—1851-56, 1857-58, 1858-64, and 1866-69. The analysis stops with 1869. No reference is made to the period 1870-73, in which the commodity price index rose more than 15½ per cent while the yield of Consols hardly even fluttered—Sauerbeck's index for these four years being 96, 100, 109, 111; and the annual average prices of Consols 92.44, 92.71, 92.46 and 92.61.

Mr. Keynes' action in not breaking up the 1873-96 period seems wise. There are no appreciable bond yield movements corresponding to the two minor upswings of annual commodity prices during the period. On the other hand, the trend of each series was undoubtedly downward throughout the period, though the commodity price decline was much more rapid in the earlier years than it was in the later and the bond yield decline much more rapid in the later years. The convex and concave appearance of the two trends may be seen in Chart 16.

Mr. Keynes next states that the two series "rose together from 1896 to 1900" and "fell together from 1901 to 1903". The first of these statements may be passed over without comment, but the second calls for some hesitation. It is true that, from 1901 to 1903, with the data Mr. Keynes was using (Sauerbeck's index number of

Before coming to any decision as to the conclusiveness of Mr. Keynes' various arguments, the reader should, of course, examine the data.⁸ That's always a good thing to do! And it is especially desirable in the present instance. Many readers are inclined to investigate for themselves the statistical adequacy of a mere verbal summary. But few have the hardihood to face boldly that mystic clincher of argument, a high coefficient of correlation. And the advocates of the various theories concerning the relations between commodity prices and interest rates have no compunction about how they use that terrifying blunderbuss.

Professor Irving Fisher has for many years been intensely interested in demonstrating the existence and investigating the economic significance of a time relation between the movements of interest rates and the movements of commodity prices. He believes, as firmly as does Mr. Keynes, that the statistical history of the two series demonstrates an interrelation that "ought to be susceptible of some explanation of a general character". Over and over again he has marshaled the

(Footnote ⁷ concluded)

commodity prices and A. H. Gibson's figures for the yield of Consols), prices fell from 70 to 69 and yields from 2.917 per cent to 2.825 per cent. The yields for 1901 and 1903 are, of course, based on the prices of the new stock that the British Government had, in 1888, offered the holders of the old 3 per cent Consols. But the Government announced in 1888 that the new stock would carry 3 per cent interest until April 5, 1889; $2\frac{3}{4}$ per cent interest thereafter until April 5, 1903; and $2\frac{1}{2}$ per cent interest thereafter until April 5, 1923, after which date the Government could redeem it at par. Now the 'yields' that Mr. Gibson assigned to this stock are not calculated on the basis of these conditions. They are calculated on the assumption that the current rate would be paid in perpetuity. For example, the 1901 yield is obtained from the 1901 average price by assuming that $2\frac{3}{4}$ per cent of par would be paid in perpetuity (the terms of the bond to the contrary notwithstanding). The 1903 assumption seems to be that the total payment of that year (2 9/16 per cent of par, or one-quarter at $2\frac{3}{4}$ and three-quarters at $2\frac{1}{2}$) would be the amount paid per annum in perpetuity. The average price of the bond was $94\frac{1}{4}$ in 1901 and $90\frac{3}{4}$ in 1903. The correctly calculated yield was *higher* and not lower in 1903 than it was in 1901. We have, in Chart 16, presented the Gibson yields. They are the yields that are used by Keynes and Fisher. But they are not correct for the period 1888 to 1903 (compare Chart 16 with Chart 19 which shows *prices* of both series).

For the whole period 1896 to 1923 the reader may check up and weigh Mr. Keynes' analysis by consulting not only Chart 16 but also Chart 19 (*price* data for the two series).

Mr. Keynes does not present any "general trends" for the period after 1923 though his table (*Treatise on Money*, p. 199) gives prices and yields annually through 1928.

⁸ See Charts 16 and 19.

evidences that high and low interest rates tend to accompany high and low commodity prices. "These high correlations do not necessarily mean that the interest rate will always be high when prices are high and low when prices are low, but the tendency toward this is definitely established."⁹ And again, ". . . over long periods of time high or low interest rates follow high or low prices by about one year."¹⁰

But Professor Fisher is not satisfied that the truly significant relation is between high and low prices and high and low rates. He finds a high correlation between *levels* difficult to explain. His theoretical analysis had suggested that interest rates (in terms of money) *ought* to be high while prices are *rising* and low while prices are *falling*. He therefore asked himself whether the interest rate figures, which seem directly dependent on price *levels*, cannot be presented at least as adequately in terms of price *changes*.

In *The Rate of Interest* (1907) he had offered evidence that short term interest rates tend to be higher during periods of rising commodity prices than during periods of falling commodity prices, and to be functionally related to the *rate* of rise or fall. At the end of a rather long statistical section, he writes: "We therefore conclude with great confidence that, 'other things being equal', *the rate of interest is relatively high when prices are rising and relatively low when prices are falling*."¹¹ The tables upon which this conclusion is based contain comparisons of 'bank' and 'market' short term interest rates in various financial centers with the annual percentage rise or fall of commodity prices during periods of rise and fall.

There is a statistical peculiarity of these early tables that does not appear in the revised form in which they are presented in Professor Fisher's later book, *The Theory of Interest* (1930). In the earlier book, periods described as periods of rising (or falling) prices include the final, *but not the initial*, years of rise (or fall).¹² But, even in the

⁹ *Theory of Interest*, p. 431.

¹⁰ *Ibid.*, p. 430.

¹¹ *The Rate of Interest*, p. 277.

¹² For example, if annual average prices ran 100, 104, 108, 104, 100, 104, 108, 104 *ad infinitum*, each period of 'rising' prices would be assumed to consist of two years with respective prices of 104 and 108; and each period of 'falling' prices would be assumed to consist of two years with prices of 104 and 100. The average price would, therefore, during years of 'rising' prices, be 106; and, during years of 'falling' prices, 102. Such treatment of the data is, of course, to be peculiarly deprecated

later book, we find evidences of the difficulty of deciding objectively how the 'periods' should be selected. For example, in the table¹³ that compares London open market rates¹⁴ with 'annual rates of change in the price level', the first four periods are given as 1825-34, 1834-39, 1839-52 and 1852-57. An examination of the lowest line of (our) Chart 16 would suggest not 1834 but 1832 as the bottom year of the decline in prices (the independent variable) from 1825; and 1849, rather than 1852, as the bottom year of the decline from 1839.¹⁵ But, if we make the seemingly unimportant substitutions of 1832 for 1834 and 1849 for 1852, we seriously affect the apparent significance of the entire table. The correlation between the interest rates (for each period) and the rates of change in the price level (for the corresponding periods) falls from the low figure $+0.33$ to the insignificant figure $+0.23$.¹⁶ And, if New York rates and American prices be used instead of London rates and English prices, the results are even more meaningless.¹⁷

By 1930, Professor Fisher himself was no longer enthusiastic about the tables comparing 'bank' and 'market' rates with average annual percentage movements of commodity prices. In the earlier book these (Footnote 12 concluded)

when the objective is to demonstrate that high interest rates accompany not high but rising commodity prices. If rates were a constant multiple of prices, they would, with such treatment, appear to be higher during periods of rising prices than during periods of falling prices—as would the prices themselves.

¹³ Table VII, p. 527, *The Theory of Interest*.

¹⁴ The averages of the Bank of England rates of discount contained in this table need correction for the periods 1852-57 and 1858-64. They are averages of the annual rates given in the table on p. 520 of *The Theory of Interest*. The rates of that table reproduce, with a few corrections, a portion of the table that appeared on pp. 418-20 of *The Rate of Interest*. But some serious errors are uncorrected. The annual averages of the Bank rates for 1853, 1854, and 1855 remain 2.7, 2.1 and 2.9 instead of the correct figures, 3.7, 5.1 and 4.9. The corresponding figure for 1859 remains 3.7 instead of 2.7. A correction of these errors would somewhat improve Professor Fisher's case. But the open market rates, which we discuss in the text, present his case more strongly than even the corrected Bank rates.

¹⁵ For the years 1831-35, the price index Professor Fisher prints and uses runs 92, 89, 91, 90, 92; for the years 1848-53, it runs 78, 74, 77, 75, 78, 95.

¹⁶ The correlation for the period from 1858 to 1927 is only $+0.19$.

¹⁷ Professor Fisher's table of New York rates and changes in American prices (Table VIII, p. 527, *The Theory of Interest*) must not be used. The calculations, and even the algebraic signs of that table, are inaccurate. For example, the period 1860-65, during which prices *rose* from 100 to 232 (on the price index used by Professor Fisher), or at the rate of 18.3 per cent per annum, is described as a period during which prices were *falling* at the rate of 14.3 per cent per annum, etc.

tables constitute the backbone of a chapter. In the later book, they are tucked away among the appendices. Indeed, in the *text* of the later book, the theory that the *levels* of rates are simply and directly related to price *changes* is completely abandoned. On page 417 of *The Theory of Interest*, we read, "A very brief examination of the charts below indicates that there is little or no *apparent* relationship between *price changes* and interest rates in any of the periods studied in either country [Great Britain and the United States] except for 1898-1924 in Great Britain" (Professor Fisher's *italics*). On page 418, we read, "These results suggest that no direct and consistent connection of real significance exists between P' and i ." ¹⁸ And, on page 427, "The studies of both the long term and short term movements of prices and interest rates give very similar results. In both studies the r 's are insignificant when P' and i are correlated directly, either with or without lagging. . . ." ¹⁹

But Professor Fisher is not disturbed by this fact now that he believes that he has discovered that rates are really related to price *changes* rather than to price *levels*—though not in any such simple manner as he once assumed and now rejects. That the coefficients of correlation between rates and price changes are small, he now feels is of no great consequence. "The small numerical value of r suggests that the relation can be revealed only faintly by P' and i directly. But a little consideration suggests that the influence of P' on i may be as-

¹⁸ By P' Professor Fisher refers to *rate of change* in commodity price level and by i to interest rate (whether bond yield or short term rate). For a fuller discussion of the meaning of these terms see Appendix B.

¹⁹ The student of Professor Fisher's *The Theory of Interest* should consider very thoughtfully the significance of comparing P' with a lagged i . For example, if he wishes to understand just how, in a particular instance, varying the lag can affect the coefficient of correlation as it does, he will examine with great care the particular pair of series that are being correlated. He will study with great technical interest such data as those presented in the chart opposite p. 426 of *The Theory of Interest*, in order to discover how a coefficient of correlation between quarterly averages of short term interest rates and quarterly changes in commodity price levels can be -0.63 without lag, -0.16 when rates are lagged two years, +0.17 when rates are lagged four years, and reach a maximum (though it be no greater than +0.35) when the rates are lagged six years—in other words when the quarterly changes in commodity prices are correlated with quarterly short term interest rates *six years ahead*. (See chart number 50, p. 426, *The Theory of Interest*.)

And he might wonder how many more maximum and minimum values for r could be obtained if the lags were extended, a year at a time, until quarterly changes in commodity prices were being compared with quarterly short term interest rates a century later.

sumed to be distributed in time—as, in fact, must evidently be true of any influence. This hypothesis proved quite fruitful in my studies several years ago, in the course of which the theory of *distributed influence* or, if we wish to avoid the implication of cause and effect, of *distributed lag* was developed in considerable detail.”²⁰

The function that Professor Fisher uses to represent ‘the aggregate influence’ of past price changes on present interest rates, he terms \bar{P}' . “Arithmetically, \bar{P}' is merely a certain weighted [arithmetic] average of sundry successive P' ’s.”²¹ The weights are the natural numbers beginning with unity.²² The most recent P' has the heaviest weight. For example, if \bar{P}' be a weighted arithmetic average of eight successive P' ’s, the weight assigned to the earliest P' will be unity, that assigned to the next P' will be two, and that of the most recent P' will be eight.

The coefficients that Professor Fisher obtained by correlating bond yields and short term interest rates with \bar{P}' , are, in almost every instance, higher than those he obtained by correlating them with P' , *but lower than those obtained by correlating them with P* . In other words, rates and yields were usually more highly correlated with ‘the weighted average of sundry successive’ price changes than they were with the individual price changes; *but not so highly correlated as they were with the raw prices*. Before offering any suggestion as to the significance of this fact, it is desirable to present some of Professor Fisher’s statistical results.

He applied the distributed lag (\bar{P}') procedure to annual commodity price and bond yield figures for three periods²³ in Great Britain, (1820–64, 1865–97 and 1898–1924); and to one period in the United States, (1900–27). For the period 1820–64 in Great Britain, operations with the ‘distributed lag’ give a maximum coefficient of +0.46,^{note 24} and direct correlation of the raw data a maximum coefficient of +0.57.^{note 25} For the period 1865–97, the ‘distributed lag’

²⁰ *The Theory of Interest*, p. 419. Professor Fisher’s italics.

²¹ *Ibid.*, p. 419. See also note 18, this chapter.

²² *Ibid.*, p. 421, lines 3–6 incl.

²³ Breaking the data up into ‘periods’ results, of course, in the mathematical equations or ‘laws’ relating the two variables to one another being (except by accident) different for each period.

²⁴ Read from Chart 46, p. 421, *The Theory of Interest*.

²⁵ Read from Chart 53, p. 430, *ibid.*

gives a maximum of $+0.80$,^{note 26} and the raw data $+0.91$.^{note 27} Only for the period 1898–1924, does the distributed lag procedure give a higher coefficient ($+0.98$ ^{note 28}) than the raw data ($+0.93$ ^{note 29}).

For the period 1900–27 in the United States, the distributed lag gives a maximum coefficient of $+0.857$,^{note 30} while the corresponding figure from the raw data is $+0.92$.^{note 31}

After discussing British and American correlations between \bar{P}' and bond yields, Professor Fisher has a few words to say about the use of the \bar{P}' procedure with American commodity prices and *short term* interest rates. He writes: "A study of short term commercial paper rates in relation to short term price movements corroborates the evidence obtained from correlating long term interest rates and price changes. The New York interest rates on short term commercial paper have been correlated with changes in the quarterly wholesale price indexes computed from monthly indexes of the United States Bureau of Labor Statistics for the periods 1890–1914 and 1915–1927."³²

For the period 1890–1914, he obtained from these quarterly data a maximum coefficient between P' and i of $+0.37$,^{note 33} by lagging i four years. But, using \bar{P}' in the form of an arithmetic average of thirty 'successive P' 's' (extending, therefore, over a period of seven and one-half years), he obtained a coefficient of $+0.41$.^{note 34} For the period 1915–27, he obtained a coefficient of $+0.35$,^{note 35} between P' and the quarterly short term rates of *six* years later.³⁶ But, by using \bar{P}' (Footnote 25 concluded)

Professor Fisher comments wistfully on the low figures for 1820–64. He writes: 'The British figures for 1820–64 give the lowest of any included in this study. These low figures are possibly due in part to the less accurate price indexes in those early years'. *Ibid.*, p. 423.

²⁶ Read from Chart 46, p. 421, *ibid.*

²⁷ Read from Chart 53, p. 430, *ibid.*

²⁸ *Ibid.*, p. 423, line 23.

²⁹ Read from Chart 53, p. 430, *ibid.*

³⁰ *Ibid.*, p. 423, line 26.

³¹ Read from Chart 53, p. 430, *ibid.*

³² *Ibid.*, p. 425.

³³ Read from Chart 50, p. 426, *ibid.*

³⁴ Read from Chart 51, p. 427, *ibid.*

³⁵ Read from Chart 50, p. 426, *ibid.*

³⁶ The text does not state what years each series covers; whether thirteen years in each instance, that is, for example, 1909–21 for prices and 1915–27 for rates; or a mere seven years, that is 1915–21 for prices and 1921–27 for rates.

In the \bar{P}' comparison of annual American prices with annual American bond yields

in the form of an arithmetic average of 120 'successive P' 's'³⁷ (extending therefore over a period of thirty years)³⁸, he obtained a coefficient of $+0.738$.^{note 39}

This is an appreciable degree of correlation. But the correlation between the *raw quarterly prices* (P) and the *raw quarterly rates* for the same period (1915-27)⁴⁰ is, without lagging, $+0.709$. And, if the rates be lagged one quarter, $+0.829$. If the rates be lagged two quarters, $r = +0.891$.^{note 41}

(Footnote³⁶ concluded)

for the period 1900-27, both types of comparison seem to have been made. See the notations in the body of Chart 47, p. 422, *The Theory of Interest*.

³⁷ Compare first paragraph of note 36.

³⁸ The coefficient of correlation is a measure of the degree of accuracy with which the relation between the two variables may be represented by a particular mathematical equation. There is always the chance that, when a period of time is broken up into pieces and correlation applied to the variables during each piece, the mathematical equations representing this relationship will differ greatly from piece to piece. The burden of proving that these differences are reasonable or at least not absurd is on the investigator who proposes the breaking up.

Now, if we interpret Professor Fisher's mathematical treatment of the problem described in the text as he asks us to interpret it, we find ourselves faced by an absurdity. The function \bar{P}' is interpreted by Professor Fisher as 'a weighted average of sundry successive P' 's'. And, because the weights assigned to the successive P' 's run 1, 2, 3, . . . , n , the variations in the influence of any particular price change (i.e., a particular P') upon successive interest rates run n , . . . , 3, 2, 1. Or, in the words of Professor Fisher, ". . . the form of variation of the weights is exactly—but in reverse order—the form in which the distributed influence of P' tapers off during successive periods of time" (*The Theory of Interest*, p. 420). But, while the correlation coefficient for the 1890-1914 period is obtained by assuming that the quarterly interest rates of that period are related in a linear manner to a \bar{P}' that contains 30 successive P' 's, the coefficient for the 1915-27 period is based on the assumption that the rates are a linear function of a \bar{P}' that contains 120 successive P' 's. This amounts to asking us to believe, for example, that the influence on interest rates of the change in price level that occurred during the last quarter of the year 1897 faded out completely by the second quarter of the year 1905 and remained zero until the first quarter of the year 1915 when it reappeared and did not disappear again until the year 1927.

If this absurdity be removed by using the same 'distributed lags' for both periods, the coefficients are greatly reduced. The numbers 30 and 120 (or at least some figure greater than 90) are an essential feature of Professor Fisher's argument. For example, if 30 be used for both periods, the 1915-27 coefficient is reduced from 0.738 to 0.52. If 40 be used, the coefficients are 0.60 and 0.34 instead of 0.738 and 0.41. If 50 be used, they are 0.63 and 0.11. (See *The Theory of Interest*, Chart on p. 427.)

³⁹ *Ibid.*, p. 427, lines 4-7 incl.

⁴⁰ For these data see *The Theory of Interest*, Appendix Tables XIV and XV, pp. 532 and 533.

⁴¹ *The Theory of Interest*, p. 431, lines 1-4.

As a statistical explanation of why the coefficients obtained by correlating the raw data⁴² for selected periods sometimes run so high, the 'distributed-lag' theory seems very weak. In all but two of the comparisons made by Professor Fisher, the application of the theory lowers the coefficient.⁴³

And, even if it usually *raised* the coefficient, that fact would not necessarily prove that rate *levels* were helpfully interpretable in terms of past price *changes*. For only technically is \bar{P}' a measure of price *change*. As the number of P' 's included in \bar{P}' is increased, the configuration of \bar{P}' (with such data as commodity price index numbers) usually approximates more and more closely the configuration of P , the original data.⁴⁴ The reason for this condition is that, if the month-to-month (or year-to-year) fluctuations of the data are not too violent (and they seldom are with commodity price index numbers), \bar{P}' tends to approximate a constant multiple of the deviation of the logarithm of the present price from an arithmetic average of the logarithms of a specified number of past prices. In other words, if for the original data we substitute their logarithms, \bar{P}' (as calculated from the original data) tends to approximate a constant multiple of the deviations of these (logarithmic) data from an uncentered moving average. The *levels* of \bar{P}' are, of course, affected by changes in this moving average, but, if the average covers a sufficiently long period of time, the *configuration* or 'shape' of the \bar{P}' curve will tend to approximate that of the log P curve, and therefore, unless the fluctuations of P are very large, the configuration of the P curve also. It is questionable, therefore, whether, even if the use of \bar{P}' raised the coefficients, we would be warranted in assuming that it did so because \bar{P}' was a 'weighted average of sundry successive P' 's' rather than because it was a deviation of log P from a moving base.

⁴² Prices and short term rates or prices and bond yields.

⁴³ One of these two comparisons supplies the only coefficient of correlation mentioned in the summary section 'Relations of Prices and Interest Interpreted' (*The Theory of Interest*, p. 438). Professor Fisher there writes: 'The rate of interest correlates very markedly with \bar{P}' , representing the *distributed* effect of lag. For recent years in Great Britain [1898-1924], the close relationship is indicated by $r = +0.98$ when i is lagged and the effects of P' are distributed over 28 years.'

⁴⁴ See Chart 48, p. 424, *The Theory of Interest*. Compare also the \bar{P}' and P lines of Chart 49, opposite p. 426, *ibid*.

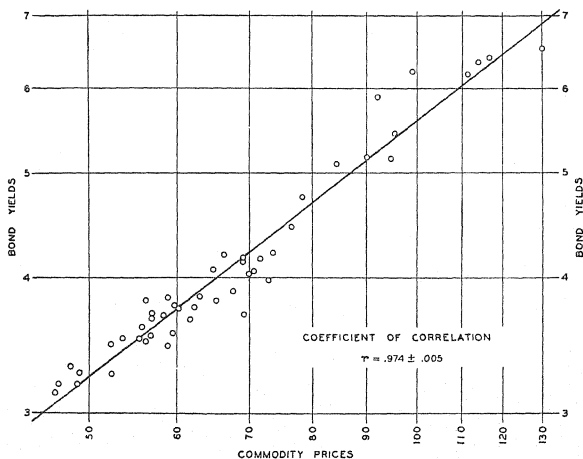
However, as the use of \bar{P} instead of P does not tend to raise the coefficients, the suspicion naturally arises that the coefficients obtained from using \bar{P} are as high as they are because of the degree of similarity of configuration of \bar{P} and P ; and not as high as when P is used

CHART 17
AMERICAN RAILROAD BOND YIELDS AND COMMODITY PRICES

COMMODITY PRICES ANNUALLY 1866-1913

BOND YIELDS ANNUALLY 1869-1916

(BOND YIELDS LAGGED THREE YEARS)



because the base from which P (in the form of $\log P$) is measured (the uncentered moving average) is not as good a base (distorting to some extent the P configuration) as the simple horizontal straight line base that correlation itself introduces.⁴⁵

But these criticisms must not blind us to the fact that casual inspection strongly suggests that there is a problem. Over long periods of

⁴⁵ See Appendix B.

time the two series seem to go up and down together. High correlations between them have been obtained and others are easy to obtain.⁴⁶ But just what and how much do these correlations mean? We must not forget that a high coefficient of correlation between two time series should never be accepted as more than merely suggestive of even probable statistical functionality, let alone causal relationship, until the mathematical origins of the high correlation have been carefully investigated.

Does the high correlation exist with respect to both long and short term movements, to both trends and deviations from trends? If it exist for long term movements, are there many such movements or is the high correlation primarily a result of one or two great movements of the data? If it exist for short term movements, how consistent is the statistical relation? Does it hold only for 'hand-picked' periods or does it hold pronouncedly throughout the range of the data, as a whole and by pieces? If it holds by pieces, does it do so without necessitating radical changes in the mathematical equation or 'law' assumed to relate the one variable to the other? Does anything that is known about the series beyond the range of accurate numerical data make it extremely probable if not almost certain that the long term or even the short term movements are *not* highly correlated or are differently related to one another in such outside ranges?

It is apparent from Chart 16 that the long term movements of the data, for either England or the United States, are very few, and that, because of the relative insignificance of the minor movements, these long term movements control the coefficients of correlation. But, for England, it is a rough and violent control. Both series were very high in the early years of the nineteenth century, declined irregularly into the late nineties of that century, advanced to great heights in 1920 and declined irregularly thereafter. But the irregularities are so great as to require explanation. The 1798 peak in the yield of Consols occurred sixteen years before the 1814 peak in commodity prices. There is no movement of Consols that can be related to the almost

⁴⁶ For example, by using only a little statistical ingenuity in the choice of functions and lags (and chicane in the choice of period), we obtained for forty-eight years of American bond yields and American commodity prices a coefficient of $+0.974 \pm 0.005$. The period covered is the whole period from the close of the American Civil War to the entry of the United States into the World War; 1866-1913 for the commodity prices and 1869-1916 for the bond yields (the bond yields are lagged three years). Both series are used in the form of logarithms. See Chart 17.

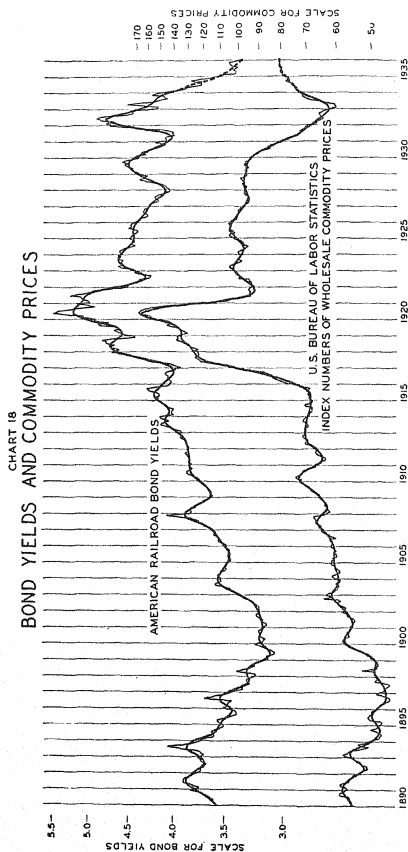
major reversal of trend in commodity prices from 1849 to 1873. And, though yields eventually completed their 1921 and 1922 fall in the thirties of the present century, they drifted slowly upward for ten years (1922-31) while commodity prices were declining; only renewing their collapse when commodity prices were ready to steady and begin a slow advance (see Chart 19). Ten years *late* on the decline instead of sixteen years *early* as in the early years of the preceding century.

Superficially considered, the American picture may seem less erratic than the British. Bond yields and commodity prices each show a huge trough beginning shortly after the close of the Civil War and ending in 1920. But, even in this period, the lags are very irregular. The early peak in bond yields came five years after the peak in commodity prices, and the beginning of the *rapid* decline was nine years later for yields than it was for prices. By the time the bottom of the trough was reached, in the nineties, the lag was less than three years; when the peak of 1920 was reached the lag had vanished.

Outside the range of the great trough, it is more difficult to show that American rates and prices were high and low or moved up and down together. Is the great fall in yields from 1857 to 1863 and 1864 to be tied up with the minor drop in commodity prices from 1857 to 1861? ⁴⁷ Before coming to any such conclusion, it would be well to remember that bond yields began their Civil War collapse only after the gigantic *rise* of commodity prices had begun. There is every reason for believing that this great fall in yields can be more properly considered as economically associated with the tremendous synchronous *rise* in prices than with the negligible preceding decline. Similarly, the gigantic snapback of yields after 1864 can be more satisfactorily tied up with the synchronous collapse of prices than with the earlier rise.

Neither American series shows any appreciable trend from 1922 to 1929. But the violent *rise* in yields from the summer of 1931 to the summer of 1932 occurred in the midst of a continuous and rapid *decline* in commodity prices that lasted from the autumn of 1929 to the spring of 1933; and the great *rise* in commodity prices that began in the spring of 1933 was accompanied by a continuous and violent

⁴⁷ Though 1857 was a peak year for bond yields, the *trend* had been downward since the early forties. The increase in the 'spread' between prices and yields during the twenty years from 1840 to 1860 is therefore tremendous.



collapse of bond yields. These movements are well illustrated by Chart 18 on which monthly data are shown.

And even if the statistical relationship between the two series were much closer and more regular than it is, what then? Ten years before he wrote his *Treatise on Money*, Mr. Keynes, in his *Treatise on Probability*,⁴⁸ explained and emphasized the importance of distinguishing between description and induction, correlation and causation. His remarks are so neatly worded that we cannot resist quoting from them.

"The Theory of Statistics, as it is now understood, can be divided into two parts which are for many purposes better kept distinct. The first function of the theory is purely *descriptive*. It devises numerical and diagrammatic methods by which certain salient characteristics of large groups of phenomena can be briefly described; and it provides formulae by the aid of which we can measure or summarise the variations in some particular character which we have observed over a long series of events or instances. The second function of the theory is *inductive*. It seeks to extend its description of certain characteristics of observed events to the corresponding characteristics of other events which have not been observed. . . .

"The union of these two distinct theories in a single science is natural. . . . But this union is also the occasion of a great deal of confusion. The statistician, who is mainly interested in the technical methods of his science, is less concerned to discover the precise conditions in which a description can be legitimately extended by induction. He slips somewhat easily from one to the other, and having found a complete and satisfactory mode of description he may take less pains over the transitional argument, which is to permit him to use this description for the purposes of generalization. . . .

" . . . By the method of correlation tables and correlation coefficients the descriptive statistician is able to effect this object [the determination of the degree of correspondence between the two variables within the field of observation], and to present the inductive scientist with a highly significant part of his data in a compact and instructive form. But the statistician has not, in calculating these coefficients of observed correlation, covered the whole ground of which the inductive scientist must take cognizance. . . .

"The truth of this is obvious; yet, not unnaturally, the more com-

⁴⁸ See the chapter on *The Nature of Statistical Inference*.

plicated and technical the preliminary statistical investigations become, the more prone inquirers are to mistake the statistical description for an inductive generalization. This tendency . . . has been further encouraged by the terminology in ordinary use. For several statistical coefficients are given the same name when they are used for purely descriptive purposes, as when corresponding coefficients are used to measure the force or the precision of an induction. The term 'probable error', for example, is used *both* for the purpose of supplementing and improving a statistical description, *and* for the purpose of indicating the precision of some generalization. The term 'correlation' itself is used *both* to describe an observed characteristic of particular phenomena *and* in the enunciation of an inductive law which relates to phenomena [of the same type] in general [both within and without the range of the observations]."⁴⁹

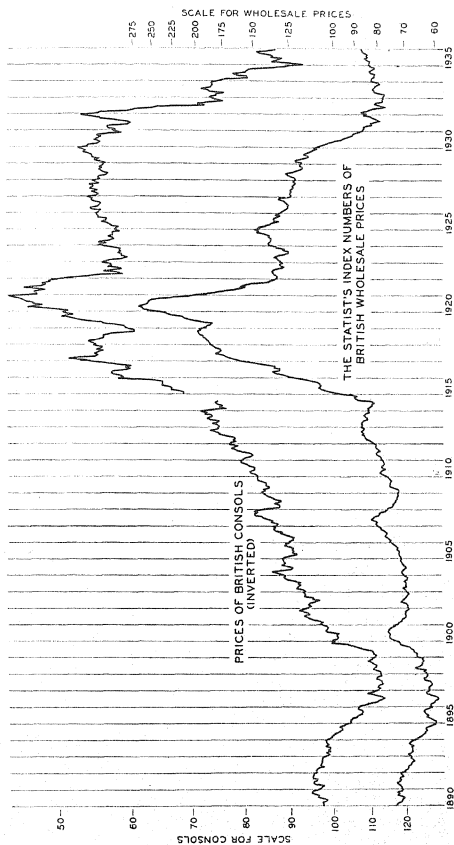
To treat a calculating machine as an instrument for the automatic attainment of theoretically useful economic generalizations is almost as unwarranted a procedure as was that of the Lagadan professor with his "project for improving speculative knowledge, by practical and mechanical operations," by which "the most ignorant person . . . may write . . . philosophy, poetry, politics, laws, mathematics, and theology, without the least assistance from genius or study".⁵⁰ To hold any naive faith in the ultimate efficacy of throwing numbers into a mathematical hopper may easily become as definite an obstacle in the path of inquiry as was the assumption by the mediaeval schoolmen that it was possible to obtain a comprehension of the world outside themselves by the critical study of words and their meaning completely divorced from the study of those things for which the words stood. And the dangers that inhere in any such naive faith are, as the quotation from Mr. Keynes has just suggested, extremely insidious dangers.

That no palpably absurd conclusion should ever be drawn from the occurrence of even the highest coefficients of correlation is so well recognized as to be assumed to merit no comment. No one suggests that, because the graduated seasonal curve of temperature in New York City shows (with a definite lag) a virtually perfect *negative* correlation with the varying seasonal distances of the earth from the sun, those variations in distance are the cause of summer and winter in this city—*great* distance causing the *heat* of summer and *lesser*

⁴⁹ John Maynard Keynes, *A Treatise on Probability*, pp. 327-29.

⁵⁰ Gulliver, Part III, Ch. V.

CHART 19
BRITISH CONSOLS AND WHOLESALE PRICES



distance the *cold* of winter. Indeed, no coefficient of correlation is ever thought of as offering even evidence, let alone proof, of causal relationship if its origin can easily be explained without any such assumption and if any causal conclusions would conflict radically with the facts as determined from evidence whose significance and interpretation is open to no such possibility of questioning.

But all too often when little or nothing is known concerning the possibility of causal relationship between the two variables, the absence of visible danger signals is unconsciously interpreted as proof of the absence of danger, and a high coefficient of correlation is seized upon with avidity as strong if not conclusive evidence of a direct and simple causal connection.

At best (when the correlation is virtually perfect) this type of reasoning is often almost indistinguishable from 'induction by simple enumeration', so contemptuously commented on by John Stuart Mill. "It consists in ascribing the character of general truths to all propositions which are true in every instance that we happen to know of. . . . Whether the instances are few or many, conclusive or inconclusive, does not much affect the matter . . . provided no other experience of a conflicting character comes unsought." ⁵¹ "The name of Empirical Laws," writes Mill in a later chapter, ⁵² has been given "to those uniformities which observation or experiment has shown to exist but on which one hesitates to rely in cases varying much from those which have been actually observed, for want of seeing *why* such a law should exist. . . . If true at all, its truth is capable of being, and requires to be accounted for."

Of course any *extremely* great regularity of either coexistence or sequence, or statistically, any extremely high and persistent "correlation" between two or more variables (without radical changes in the functional relation) should suggest strongly that the nature of the relation and the possibility that it might be more than merely "empirical" should be carefully considered. Hypotheses to explain the regularity should be constructed and tested not merely for statistical adequacy but also for logical consistency and plausibility; and for the accordance or non-accordance with fact of the implications that they will necessarily involve. And, even if no hypothesis can be formulated that stands up

⁵¹ *Logic*, Book III, Ch. III.

⁵² *Logic*, Book III, Ch. XVI.

under investigation and analysis, the assumption should not too easily and cavalierly be made that the search for such an hypothesis should definitely be abandoned.

Writers on scientific method, and even scientific investigators, have sometimes too hurriedly assumed that unexplained apparent relationships were non-existent, accidental, or at best mere empirical curiosities. Bode's Law, according to which the relative distances of the various planets from the sun were expressed by an extremely simple formula, began as an arithmetic curiosity but became accepted as demanding explanation when, upon the discovery of Uranus, the distance of that planet from the sun was found to follow the 'law'. But, when Neptune was discovered and its distance from the sun was found to be quite different from that required by the formula, Bode's 'Law' became accepted, not as demanding explanation, but as the perfect example of accidental and unmeaning empiricism.

However, in recent years, astronomers have begun to suggest that Bode's Law fails to cover the cases of Neptune and Pluto, not because the relative distance of the planets from the sun should not be expected to follow any 'law' but because of the inadequacy of the particular 'law' Bode proposed. The suspicion is becoming general that Bode's Law is empirical primarily in the technical sense in which so many engineering formulas are empirical rather than in the more fundamental sense in which any explanation of summer and winter in terms of the varying distance of the earth from the sun would be empirical; that it is empirical not because the relation it attempts to describe is non-existent, or scientifically irrelevant, accidental and without fundamental significance, but because the mathematical formulation of the law is of such a nature that, even if it covered all the facts with which it is directly concerned, it not only could not be used to unearth new facts and discover new relations by mere mathematical analysis, but its implications would conflict with the body of more rigidly established astronomical fact.

Merz could think of no more damning indictment of Mendeléef's periodic classification of the chemical elements than to suggest that it might be as purely empirical as "the once well-known but now [1896] forgotten law of Bode".⁵³ But Mendeléef's classification is no longer a mere curiosity. The recognition of its fundamental signifi-

⁵³ *History of European Thought in the Nineteenth Century*, I, 422 and 423.

cance has grown steadily since Merz wrote. It is almost as easy to make the mistake of assuming that a rational law is merely empirical as it is to make the mistake of assuming that a mere empirical curiosity is rational.

An empirical law or unexplained generalization that presents, in a not palpably absurd form, an astonishingly adequate descriptive summary of observed facts usually merits careful consideration, but the consideration it merits varies with the adequacy of the descriptive summary. The summary is, at best, only an hypothesis. And, to the extent that it is full of holes and exceptions, it loses its right to demand consideration, let alone explanation. In this respect an empirical law differs from a well established and seemingly rational generalization that has been fitted into its proper place among allied scientific generalizations, that helps to explain them and that is explained by them. The unexplained perturbations in the orbit of the planet Uranus led Adams and Leverrier to suspect the existence of some other as yet undiscovered planet rather than to doubt the Newtonian formulation of the law of gravitation. The calculations of Leverrier concerning the size and position of the new planet were almost instantly verified by Dr. Galle's discovery of the planet Neptune.⁵⁴

The 'explanation' that lifts a generalization out of the empirical and into the rational need not be of a directly causal type. Two variables, such as the diameter and circumference of a circle, may be *functionally* related without the suggestion of a causal nexus. A statistical 'law' relating the height and weight of men does not necessarily suggest that variations in either variable are *caused* by variations in the other. Similar illustrations may be taken from the field of economics. The high correlation between the prices of substitutes or partial substitutes, such as scrap and pig iron, is evidence of a functional but not of a one-way causal relation. Different effects of the same cause yield examples in which the variables themselves are not causally related to one another. For instance, the effects of year to year variations in rain-

⁵⁴ Of course, an exception that needs an *ad hoc* hypothesis to explain it always casts some degree of doubt on the original generalization until the *ad hoc* hypothesis is verified. We must not forget that Leverrier's later suggestion that the unexplained perturbations of the planet Mercury pointed to the existence of an undiscovered planet (Vulcan) between Mercury and the Sun was never verified, and that the perturbations of Mercury were explained only when Einstein's hypothesis had amended that of Newton.

fall on the year to year variations in the yield per acre of different crops in the same area. The seasons carry a succession of agricultural phenomena that may be described as functionally but not as causally related to one another. The peak in strawberry production precedes the peak in apple production, though the two production series are not causally related.

But the fact that the 'explanation' that lifts the empirical into the rational need not be of a directly causal type does not warrant throwing entirely aside the concept of causation. Though an almost impregnable metaphysical case can be made for the contention that the most desirable objective of science, and indeed the only one that it can possibly attain, is to *describe* phenomena completely and in the simplest possible manner, the unthinking acceptance of this doctrine may easily lead to meaningless and useless empiricism. It is all too easy to forget the tremendous significance that must be attached to the words 'completely and in the simplest possible manner'.

The casting out of the metaphysical devil of causation all too easily leads to his return with seven other devils. The economist must beware that the statistician, while seeming merely to describe mathematically certain characteristics of the data, does not insidiously suggest a causal relation, though the evidence be evidence only of the probability—or possibility—of a functional one. He must not allow himself to be befogged by professional patter about a 'multiplicity of causes' if there is a definite possibility that the variables that are being statistically compared are not themselves causally related. In such cases, he would usually be well advised to forget that science is merely description and to think in terms of a less refined but simpler metaphysics of *verae causae*.

Now it is true that, in various countries and often for long periods of time, the movements of interest rates (or rather bond yields) and commodity prices have been such as to suggest that they might be rationally related to one another in some direct and simple manner. But, over the whole range of available data, the exceptions to this appearance of relationship are so numerous and so glaring that they cannot be overlooked. And the *distribution* of the exceptions is such as to awaken the liveliest suspicion that any theory which proposes an explanation of the apparent agreements should also explain the unmistakable exceptions. The exceptions are not scattered over the range

of the data in a haphazard manner; they occur in 'bunches'. And, the timing of these 'bunches' or *periods* of exception is such as not only to suggest why the exceptions occur but also to throw considerable light on the assumed functionality let alone causality of the periods of agreement.⁵⁵

Of course, if any formula that was not palpably artificial and *ad hoc* described at all adequately the entire range of the data, it could not reasonably be thrust aside without the most careful study of why it did so. But so far no one of the numerous attempts that have been made to develop even a good descriptive summary of the supposedly close relation has led to any such accurate and reliable account of all that has actually occurred as to call insistently for explanation. And, even if such a good descriptive summary existed, we should still be faced with the important question, what, if any, are the causal elements in the statistical relation.

The common assumption that, between the bond yield and commodity price series, such causal elements exist and are important has resulted not merely from the aggressiveness with which readers of economic literature have been assured that statistics support the contention that a functional relation exists; but also from the apparent simplicity of explaining why it *should* exist. But the 'explanations' are numerous and some of the more popular ones are mutually contradictory. Any explanation seems good enough. Indeed, all too often the elucidations sound suspiciously like what the Freudian psychologists term 'rationalizations'. And this is but what might be expected. If a formula be empirical in the fundamental sense that it is unrelated or only distantly related to the true causes of the phenomena it attempts to describe, it naturally tends to be difficult to explain. To ask why seasonal variations in the temperature of New York City are caused by variations in the distance of the earth from the sun or why the strawberry crop gives rise to an apple crop three months later is to

⁵⁵ In the statistical comparison of time series, mere absence of the highest degree of correlation, if the absence results from a moderate degree of irregularity in the relation *over the whole period*, may often reasonably be assumed to result from the disturbing effects of other causal factors. But, when the hypothetical relation sometimes disappears completely for years or even decades at a time, the investigator should seriously consider the possibility that causal relationship either does not exist or is of a more complicated and totally different kind from the simple and direct relation suggested by the correlation during the periods in which it is high.

propound questions worthy of a lawyer cross-examining an expert witness.

And, as we have already seen, of the mathematical relations that are presented by the various writers on interest rates and commodity prices, those giving the highest coefficients of correlation are often those that seem most suspiciously empirical and difficult to explain. For example, if the data be assumed to support the contention that the *levels* of interest rates or bond yields depend upon the *levels* of commodity prices, they indeed seem to prove too much. Professor Fisher has himself remarked that ". . . it seems impossible to interpret it [the association of high and low rates with high and low price levels] as representing an independent relationship with any rational theoretical basis. It certainly stands to reason that *in the long run* a high level of prices due to previous monetary and credit inflation ought not to be associated with any higher rate of interest than the low level before the inflation took place. It is inconceivable that, for instance, the rate of interest in France and Italy should tend to be permanently higher because of the depreciation of the franc and the lira, or that a billionfold inflation as in Germany or Russia would, after stabilization, permanently elevate interest accordingly. This would be as absurd as it would be to suppose that the rate of interest in the United States would be put on a higher level if we were to call a cent a dollar and thereby raise the price level a hundredfold. The price level as such can evidently have no permanent influence on the rate of interest except as a matter of transition from one level or plateau to another."⁵⁰

But the apparently high correlation between the levels of commodity prices and the levels of bond yields is explained with great confidence by the average businessman. It would seem permissible to lighten the present discussion by digressing for a moment to notice some of the explanations he offers. The commonest one is that interest rates and bond yields are naturally and logically higher in periods of high commodity prices than they are in periods of low commodity prices because in periods of high commodity prices "a dollar is worth less and hence lenders will insist on borrowers paying more dollars for a loan just as they pay more dollars per bushel for potatoes". The argument is that interest is a price—the price paid for a loan. For it to be high when prices in general are high is therefore quite as natural as for

⁵⁰ *The Theory of Interest*, pp. 440, 441.

the price of pig iron or the price of potatoes to be high when prices in general are high. Incomes must be adjusted to the level of commodity prices. Lenders, therefore, will naturally insist on higher interest rates when prices are high than when they are low.

Persons who are satisfied with the above explanation never bother to ask themselves why *borrowers*, in a period of high commodity prices, should not insist that *lenders*, in return for the promise of a specified future money income, pay the *borrowers* more (present) dollars, because, in such a period, *those* dollars are worth less. But this idea has actually been used to develop the conclusion that high commodity prices, instead of being naturally accompanied by *high* interest rates, should naturally be accompanied by low rates. Of course, as interest rates and commodity prices show more of a tendency to be high and low together than *vice versa*, the theory, as an explanation of the actual facts, is worse than useless. But the reasoning, as such, is slightly more plausible than that presented in the preceding paragraph. As the Red Queen might have remarked, "I've heard nonsense, compared with which this would be as sensible as a dictionary." The argument has been definitely formulated as follows: "Money is valuable only as it commands commodities or services and therefore the price of money, which is interest, should vary inversely with the price of commodities."⁵⁷

The origin of the strange fallacies of confusion illustrated in the two preceding paragraphs is, of course, easily traceable to a muddle-headed use of the word *price*. The rate of interest may, for some purposes, be considered a *price*—but a different kind of price from the

⁵⁷ O. K. Burrell, *The Behavior of Bond Prices in Major Business Cycles* (University of Oregon Studies in Business No. 13), p. 62.

In this instance, the author's apparent assumption that the theory was useful to explain the facts as they are seems to have been made in a moment of inadvertence. Not only the statement on p. 6 where he writes, "Bond *prices* normally vary inversely with commodity prices . . .", but also the context on p. 62 seems inconsistent with the idea that he really thought that the rate of interest even tended to "vary *inversely* with the price of commodities". The context on p. 62 runs as follows: "This long range rise in bonds and decline in commodities may be explained on two bases. In the first place, there is probably a causal relationship between the level of commodity prices and the level of bond prices. Money is valuable only as it commands commodities or services and therefore the price of money, which is interest, should vary inversely with the price of commodities. Probably a more fundamental explanation of the long term relationship between commodity prices and bond prices is that the same influences that operate to force commodity prices downward cause bond prices to move upward, and *vice versa*."

price of commodities. The *price* of a commodity at a specified date refers to an exchange relation between a specified quantity of money at the specified date and a specified quantity of the commodity at the same date. Potatoes are fifty cents a bushel when fifty cents of present money will exchange for one bushel of present potatoes. The relation is an exchange relation between different things at the same date.⁵⁸ Now a rate of interest refers to a quite different kind of exchange relation. It is an exchange relation between the same thing at different dates instead of an exchange relation between different things at the same date. The relation is not between present money and present something else but between present money and future money. Money is on both sides of the equation.

And this brings up another phase of the absurdity inherent in the 'price' arguments—also unsuspected by their naive proponents. A price is a ratio. A rise in the potato price of cotton is a fall in the cotton price of potatoes. A high rate of interest indicates a high price for present money in terms of future money. But a high price for present money in terms of future money is a low price for future money in terms of present money. If either of these ratios is to be considered as the same kind of a price as the price of a commodity, it surely should be the price of future money in terms of present money and not *vice versa*. Present money can be used to buy future money or present commodities.⁵⁹

The recognition that the exchange relation to which a rate of interest attaches is an exchange relation between present money and future money.⁵⁸ Even so-called 'future' contracts do not constitute real exceptions to this definition. Though a typical 'future' contract, such as a contract to buy and sell wheat or cotton on a specified future date or within specified future dates may be entered into at the present time and, though the exchange to which it refers may not actually occur until some time in the future, that exchange, when it does occur, will be of different things at the same date.

The case in which money is paid in the present in exchange for an agreement to deliver a commodity in the future is, of course, a hybrid. The price paid in the present is the price that, at present, seems a proper future price under a 'future' contract such as that just described, less a deduction determined by interest rate considerations. It contains two elements, a (future) price element and an interest rate element. Similarly with the purchase of a durable good such as a house. Whether the house is to be lived in by the owner or to be rented, the future returns are 'discounted'.

⁵⁹ It is this consideration that led us to suggest that the analogical reasoning back of the second of the two theories we have been examining is, in some respects, slightly more logical or at least more verbally plausible than that back of the first and commoner theory.

money, between the same thing at different dates, and not an exchange relation between different things at the same date has led to an extremely simple but also extremely naive explanation of why rates and prices have moved as they have. Because the explanation exhibits some real comprehension of the fundamental nature of interest rates, it offers, from a purely formal standpoint, a much more logical explanation than either of the two preceding ones. But it not only shows a deplorably inadequate acquaintance with the historical facts to be explained but also assumes on the part of borrowers and lenders a capacity to forecast the future that is positively fantastic. It explains why almost all men are either inordinately rich or excessively clever by drawing attention to the effectiveness of the almost universal desire to be one or the other—if not both.

When a lender gives up present money in exchange for a promise to pay future money, he relinquishes, so runs the theory, a possibility of present spending in return for a possibility of future spending. And, if the purchasing power or spending potentialities of a present dollar are greater than the spending potentialities of a future dollar, because commodity prices are at present lower than they will be when the future payments are to be made, the lender will insist upon and the borrower will acquiesce in a higher rate of interest than would be agreed upon by both if future commodity prices were to be lower than or even the same as present prices. The theory asserts that the buyer of a bond, for example, is not buying a series of future money payments but a series of future commodities and services (which the future money payments will be used to obtain). If the money prices of commodities and services are to be relatively high in the future, the future money income will necessarily buy but little. The present money price of the bond will therefore be relatively low, and the 'yield' or 'rate of interest' correspondingly high.

Of course, no one proposing this explanation of why rates and prices have moved as they have would think of even suggesting that borrowers and lenders, who are responsible for the movements of interest rates and bond yields, are capable of forecasting with complete and mathematical accuracy the future of commodity prices. They would no more think of making such a suggestion than they would think of suggesting that buyers and sellers of high-grade long-term bonds are capable of forecasting accurately the future of short-term interest

rates. However, an enlightening first approach to the problems presented by any theory that interest rates and bond yields are completely determined, or even usually greatly affected, by forecasts of future commodity prices may be made by beginning with just such absolute assumptions. What would be the movements of short and long term interest rates if borrowers and lenders, valuing future funds only because they could be used in the future to purchase commodities, were able accurately to forecast future commodity prices; and, because of their forecasts, so operated in the money and investment markets that both short and long term rates were always logically adjusted to the future movements of commodity prices—the short term directly, and the long term indirectly (in accordance with the principle of ‘investment indifference’⁶⁰)?

Under these hypothetical conditions the *levels* of short-term interest rates would vary with the *rates of change* of commodity prices. If prices were *advancing* rapidly short-term rates would be *high* and, *vice versa*, if prices were *declining* rapidly short-term rates would be *low*. For example, if short-term rates could be assumed to remain constant at, say, four per cent per annum when the level of commodity prices was not changing; then, during a period in which prices were rising at the rate of 6 per cent per annum, rates would remain constant at a little less than ten and a quarter (10.24) per cent per annum.⁶¹

If future commodity prices were to trace out a sine curve on a logarithmic scale, short-term interest rates (plus unity) would trace out a curve resembling the commodity price curve, but the maximum interest rates would occur when the *slope* of the logarithmic price curve was at a maximum, and the minimum rates when the *slope* of the price curve was at a minimum. The maxima and minima of the short-term interest rate curve would *precede* the maxima and minima of the commodity price curve by a quarter cycle.

⁶⁰ See Ch. II.

⁶¹ In addition to the usual absurdities brought to light by a discussion of the implications of any such contrary-to-fact assumptions as those we are making, a peculiar and specific unreality is here suggested. If commodity prices were *declining* at the rate of six per cent per annum, short-term rates should stand at approximately *minus* two and a quarter (2.24) per cent per annum. But, as money is physically not a perishable commodity, *bona fide* negative rates, that is negative rates that are not measures of the value placed on some privilege or right unconnected with the receipt of interest, are even theoretically quite impossible beyond the extremely low percentage necessary to cover safe-deposit or other custodial charges.

Furthermore (under the doctrine of 'investment indifference'), during a period in which commodity prices were rising at a constant rate, and in which short-term interest rates therefore remained constant, the return that could be obtained by buying (without commission) a bond of hypothetically absolute security and later selling it (also without commission) would be a constant rate per annum—the same rate as the short-term rate. If the 'current' yield of the bond, as the brokers term it, in other words the yield on the arbitrary assumption that the bond is a perpetuity, were less than the constant short-term paper rate, the *price* of the bond would *advance* (and the 'current' yield *decline*) continually throughout the period; if the 'current' yield were greater than the constant short-term paper rate, the *price* of the bond would *decline* (and the 'current' yield *advance*) throughout the period.⁶² Furthermore, if, at the beginning of any six months' period, the bond's *yield to maturity* were *less* than the short-term rate for the next six months, the yield to maturity would have to decline still further during that six months. *But the bond would not necessarily advance in price.*⁶³ And *vice versa*.

If the movement of interest rates were completely determined by a knowledge of the future movements of commodity prices and if it were known that commodity prices were, in the future, to move up and down in a sinusoidal manner, short term rates would, as we have seen, move in a similar manner but reach maxima and minima a quarter cycle early. However, as bond yields (to maturity) would be declining whenever short term interest rates were above the yield of the bonds and advancing whenever the short term rates were below the yield of the bonds, the bond yields would tend to reach maxima and minima

⁶² In each case, the assumption must be made that, because of complete knowledge of the future of commodity prices and short-term interest rates, the price of the bond at the time of purchase would be such as to permit these price movements to occur in such a manner as to end (at 'maturity') with the face of the bond plus the last coupon.

⁶³ If a 6 per cent bond having 2 years to run sells for 103.81, its yield to maturity is 4 per cent per annum. If at the end of six months (1½ years to run) it sells for \$103.62, its yield is then 3½ per cent per annum. The realized return over the six months to a purchaser who bought at \$103.81 immediately after one coupon payment and sold at \$103.62 immediately after the next would be \$2.81 (\$3.00 coupon minus 19 cents depreciation in price) on an investment of \$103.81 or more than 2.7 per cent *per half year*. Assuming this to have been the semi-annual return on short-term money, we see the bond yielding at both dates less than the short-term rate and the yield falling between the dates *but the price also falling*. See Ch. II.

at approximately (*very* shortly after) the dates on which commodity prices reached *minima* and *maxima*. But the proponents of the theory do not offer it as an explanation of why bond yields should be low when commodity prices are *high* and *high* when commodity prices are *low*, but as an explanation of why yields and prices are so often high and low together.⁶⁴

Of course, if only the *near* future of commodity prices (and hence of short term interest rates) were foreseen, there would be no reason

⁶⁴ Compare J. M. Keynes, *A Treatise on Money*, II, pp. 202 and 203.

"Nor can we regard the facts as an example of Professor Irving Fisher's well-known theorem as to the relation between the rate of interest and the appreciation (or depreciation) in the value of money. Indeed quite the contrary. For the compensatory movements which Professor Fisher postulates relate to the sum of money repayable a year hence against cash loaned today which will cover interest *plus* (or *minus*) an allowance for the change in the value of money during the year. Thus, if real interest is 5 per cent per annum and the value of money is falling 2 per cent per annum, the lender requires the repayment of 107 in terms of money a year hence in return for 100 loaned today. But the movements to which Mr. Gibson calls attention, so far from being compensatory, are aggravating in their effect on the relation between lender and borrower. For he shows us that, if prices are rising (*e.g.*) 2 per cent per annum, this will usually be associated with a tendency for the capital value of long-dated securities to be *falling* 2 per annum; so that the purchaser of long-dated securities will possess a year later a sum which is worth 2 per cent less in terms of money which is itself 2 per cent less valuable, so that he is 4 per cent worse off, the two factors of change not balancing, but aggravating, one another—whilst the variations in the rate of interest earned during the year in question are too small to make much difference."

The theory here attacked by Mr. Keynes is presented most openly in Professor Fisher's earlier book, *The Rate of Interest*. Mr. Keynes' criticism is useful because suggestive. But the reader should notice that he takes no cognizance of either the relation of 'investment indifference' which, theoretically, should exist between bond yields and (known) future short term interest rates or the distinction between 'promised' and 'realized' yields. Professor Fisher's contention was that, if 'real' (or 'commodity') interest for the next year was to be 5 per cent per annum and it was known that commodity prices were, during that time, to rise 2 per cent, a lender would insist that, if he were to lend his money for that year, 7+ per cent per annum must be 'promised' him. What effect his insistence should theoretically have on the yields of outstanding long term bonds Professor Fisher does not say. It is, however, at least imaginable that, if borrowers and lenders thought in terms of 'commodity' rather than 'money' rates and if they could see into the future of commodity prices for one year but not for more than one year, 'promised' yields on one-year loans could follow Professor Fisher's scheme; though, in the absence of knowledge of future short term rates beyond one year, bond prices and yields would not move in such a manner as to create a condition of 'investment indifference' and hence the return 'realized' by buying a bond and selling it one year later would not necessarily correspond to the 7+ per cent yield 'promised' in the one-year note.

for a relation of 'investment indifference' to arise between long term bonds and short term notes. As a period of rising commodity prices approached and began to be foreseen, both short and long term rates would rise; the short term rates as soon as commodity prices actually began to rise and the long term rates almost immediately, because the foreseeing of the future high short term rates (which would come with the rising commodity prices) would produce an upward adjustment in the community's estimate of that peculiar 'average' of expected short term rates that would constitute a bond 'yield'. Such a condition could, of course, help to explain why 'investment indifference' is not a reality of the market place, why bond yields are always being 'adjusted' to short term interest rates but only to short term rates that are unmistakably imminent or have already materialized.⁶⁵

There is still another type of forecasting theory. It is that the movements of interest rates depend on forecasts of future commodity prices but that the forecasts are not necessarily good or even conscious forecasts. They are mere unreasoning carry-overs from the past, from what has been occurring. This type of theory contends that the longer a commodity price movement lasts the more do borrowers and lenders consciously or unconsciously adjust their dealings with one another to the assumption that the movement will continue, and interest rates therefore continue to rise (or fall) as long as commodity prices continue to rise (or fall). This contention does not involve the proven absurdity of assuming good forecasting to be habitual or even usual, but the theory fails as a general explanation of the facts, though the consideration it stresses may often be a minor and sometimes, under peculiarly exceptional circumstances, a major factor in the determination of rates.⁶⁶

Forecasts that prevailing price movements will continue tend to be better than would be those based on the mere flips of a coin, only because commodity price movements so often gather very considerable

⁶⁵ Of course, even the *near* future of short term rates is, as we have shown in Chapter II, seldom foreseen with much accuracy. The 'adjustment' of bond yields to short term rates is usually an adjustment to present or past rates. As an adjustment to future rates, it is almost invariably overdone—as though the forecast were that a present high level of short term rates was an important indication that those rates would permanently or at least for a long time be much higher than had been expected before they rose.

⁶⁶ For example, in a period of pronounced and increasing currency inflation.

momentum. They never last forever but they often last a considerable time. Innumerable minor fluctuations may be superposed on major swings but the picture is usually like stormy waves on the open sea or rolling hills and surface irregularities in a mountainous country rather than like ripples on the flat surface of a small pond or ups and downs in a ploughed field. As the crest or trough of a great wave is reached, in other words when the future is no longer to be as the past has been, the forecasting is almost always exceedingly bad; that it is usually a mere straight-line projection of *past* price movements soon becomes all too evident. In the absence of startling occurrences whose economic significance seems fairly plain (such as war or a runaway currency inflation), rational as opposed to such mere projective forecasting is rare.⁶⁷

At this stage of the discussion it is desirable to introduce and examine an assumption that is implicit in most of the theories that stress the importance of conscious or unconscious commodity price forecasting. That assumption is that the only, or at least the overwhelmingly important, reason why anyone should value a promise to pay money in the future is that future money can be used, in the future, to buy commodities. Indeed, the suggestion has often been made that 'money' interest was a mere artificiality and 'commodity' interest the only 'real' interest.⁶⁸

⁶⁷ Professor Fisher, though he continues to strike the conscious-forecasting note, tends to press down more and more resolutely on the soft pedal. And that seems wise. The third sentence of Ch. XIV of *The Rate of Interest* (1907) states: "The object will be to ascertain the extent to which, in the actual world, the appreciation or depreciation of the monetary standard is foreseen by borrowers and lenders, and provided for in the rates of interest upon which they agree." The corresponding sentence of the corresponding chapter (XIX) of *The Theory of Interest* (1930) runs: "The main object of this chapter is to ascertain to what extent, if at all, a change in the general price level actually affects the market rates of interest." In many parts of the chapter of the later book, the language of forecasting persists but it often seems to be a mere hang-over from the earlier book. The theory of the "distributed lag" (presented in the later book) explains the movements of interest rates exclusively in terms of *past* commodity price movements.

⁶⁸ Compare Irving Fisher, *The Theory of Interest*, p. 42.

"Is there, then, no absolute standard of value in terms of which real interest should be expressed? Real income, a composite of consumption goods and services, in other words, a cost of living index in accordance with the principles set forth in Chapter I, affords a practical objective standard. By means of such an index number we may translate the nominal, or money rate of interest, into a goods rate or real rate of interest, just as we translate money wages into real wages."

In recent years, this idea has gained considerable currency. Indeed, many buyers of bonds rather sententiously assert that, before investing, they attempt to forecast the cost of living. They insist upon the importance of future 'corned beef and cabbage' as opposed to future money. However, even the briefest interrogation will quickly disclose the fact that in almost every instance they are not talking about their own corned beef and cabbage but some one else's corned beef and cabbage. They personally are concerned only with future *money*. They want *money* interest and if possible a *money* profit on the purchase price of the bond. Even those investors⁶⁹ for whom the importance of future money might seem to be fairly measurable by the future commodities and services that it could buy, almost always think and act in terms of money rather than in terms of its future purchasing power. With exceptions so rare as to be negligible, the only reason why bond buyers or sellers talk about commodity prices is that they believe commodity price movements are highly correlated with bond price movements. Why this is so they do not know. Introspection leads them nowhere. They themselves do not think in terms of commodities.⁷⁰ All the 'corned beef and cabbage' talk is purely impersonal. It circulates like gossip without serious scrutiny or even clear formulation.

Corned beef and cabbage theories grossly underestimate the importance of money as *undifferentiated* purchasing power. Unless a potential lender of money who intends to use the resulting income for the purchase of consumers' commodities knows that he will, in the future, want only commodities that, because they do not deteriorate with time, can be bought in the present, and, unless he also knows exactly what commodities he will then want, he cannot forestall his future needs by present purchasing.⁷¹ To the extent that his future

⁶⁹ Such as retired business and professional men who are free from debt and are living on the returns from their investments.

⁷⁰ This is, of course, not true when, as in the midst of an uncontrolled paper money inflation accompanied by rapidly increasing distrust in the currency as such, the probability of an *extremely violent* price movement seems great.

⁷¹ And he cannot *advantageously* forestall his future needs for even commodities that will not appreciably deteriorate, unless the market price of such commodities is to advance more rapidly than would money accumulate if placed in a superlatively secure investment maturing at the time he will wish to use the commodities. For instance, if the 'lender' discussed by Mr. Keynes (see note 64) were unwilling to accept 5 per cent money interest for a year because commodity prices were to rise 2 per cent during the year, he could not better himself by buying commodities and selling them at the end of the year with a profit of 2 per cent.

wants will be for perishable goods, he will want future purchasing power; and, to the extent that he does not now know what those wants will be, he will want not a ticket good merely for particular commodities but *undifferentiated* future purchasing power. He may, of course, obtain this undifferentiated purchasing power by speculating in commodities that he does not want to use or by engaging in a business that would be advantageously affected by a rise in the general price level. But the fact remains that what he wants and should want is undifferentiated future purchasing power—in other words, money not commodities.

And, for every dollar lent by such an individual who thinks in terms of future purchasing power (even if undifferentiated), there are many many dollars lent by institutions whose managers do not and should not so think. The corned beef and cabbage theory forgets that future money can be used to discharge future money obligations as well as to buy future commodities. The largest buyers of bonds are the banks and insurance companies. To liquidate their future money obligations, they clearly will need future dollars and not future commodities. If the managers of such institutions are interested in what happens to the market value of their bond portfolios, and if they believe that the movements of commodity prices affect the movements of bond yields, they will, of course, be interested in the future of commodity prices; just as they will be interested in the future of business activity. But their direct concern is with dollars and not with corned beef and cabbage. The same is true of borrowers. Though, like lenders, they may be affected indirectly by their intelligent or unintelligent pondering over the possible influence that future commodity price movements may have on future interest rates, they certainly do not, in their own business calculations, usually measure or even think of future interest payments in terms of relinquished future purchasing power. Unless they expect a *gigantic* rise or a *gigantic* fall in commodity prices, both borrowers and lenders tend to think in terms of money rather than in terms of commodities.

And thinking in terms of gold rather than paper is only partially an exception to this rule. Though, when such thinking occurs, the relatively stable purchasing power of gold may be stressed, the gold is not thought of as a commodity that, because of its physical characteristics, is desirable for its own sake; but as another and better money. It is

not wanted because it can be used to manufacture jewelry or tone photographs, but because of its undifferentiated purchasing power. It has been, and to a considerable extent still is, 'the money of the international republic'. It can be used as such or (at least till recently) converted into a larger or smaller number of paper dollars. But, whether to be converted or to remain unconverted, it is thought of as the supreme type of undifferentiated purchasing power.

If serious doubt arises as to the monetary soundness of the home currency, a foreign money, especially if it be gold, may be thought of as a more 'real' money. But, in the absence of any such doubt, the purchase of a bond payable in the foreign money will tend to be thought of by all, except those to whom for one reason or another the foreign currency is really 'money', as a speculation rather than an investment. During the long period in which the commodity purchasing power of silver was more stable than that of gold, there was no visible tendency for the inhabitants of countries on a gold basis to think of bonds payable in silver as more conservative and less speculative 'investments' than those payable in gold.

Of course if, in a particular market, there exist a general forecast that the price of a foreign money in terms of the home money is to rise or fall, and if there be in that market two bonds similar in all respects save that the one bond is payable in the money of the market and the other bond in the foreign money, then the *relation* between the promised yields of the two bonds (calculated for each bond in terms of the money in which its promises are made) will tend to be affected by this forecast.⁷² The anticipated change in the price of the one money in terms of the other money may, of course, be expressed in terms of anticipated changes in the general purchasing powers of the two moneys. But the introduction of these new (and presumably unknown) variables is quite unnecessary. In determining the *relation* between the two yields, borrowers and lenders are concerned with the present and future prices of a unit of the one money in terms of a

⁷² Compare Professor Fisher's table giving, annually for the period 1865-1906 inclusive, the gold yield of British India bonds payable in gold and the silver yield of British India bonds payable in silver, both yields being calculated from prices in the London market. *The Rate of Interest*, pp. 266-68 and *The Theory of Interest*, p. 404.

The relations between the yields of the table are far different from what they would have been had they been controlled by good price forecasting.

unit of the other money, entirely divorced from anticipated changes in the general purchasing power of a unit of either money. It is not necessary for them to forecast whether general purchasing power will be increasing for one money and decreasing for the other or increasing or decreasing for both.

Because of the desire for future 'money' there will, in any market, tend to be a factor favoring bonds payable in the money of that market. But this factor is of a monetary rather than a commodity nature. It exists whether the money of the market be appreciating or depreciating in terms of commodities or of another money. Only if the purchasing power of the market money declines so rapidly and far as to affect radically the essential monetary characteristics of the market money will the influence of this factor disappear or become reversed. In the past, its importance seems usually to have been definitely on the wane when the inhabitants of a country in the throes of a currency inflation have begun to stop ascribing their troubles to a rise in the currency price of gold and to talk about a fall in the gold price of the currency. By the time that most important contracts are being made in terms of gold or some foreign currency, the influence of this 'home market' factor has become reversed. The 'flight' from the old money is then nearly complete. No longer is it *the* money of the country. 'At long last' has come recognition that the trouble is with the paper and not with the gold. " 'It is not I who am ailing', said the wizard; 'but there is one here very sick'."

But, in the absence of radical inflation and assuming, as we have been doing, that the monetary obligations of the buyers and sellers are predominantly in terms of the money of the market in which the bonds are being bought and sold, it would seem that the importance of the factor favoring bonds promising payment in that money would not usually be appreciably affected by a change in the forecast of the future price relations between it and some other money. The factor exists not because of the nature of such forecasts but because of their uncertainty. Its influence is usually therefore to a high degree independent of the influence of those forecasts.

If, in the seventies or eighties of the last century, a retired London banker, who neither had nor expected to have monetary obligations payable in rupees, had been weighing the relative investment attractiveness of the gold and silver bonds of British India, he would not

have bought a rupee bond if he expected rupees (in terms of pounds sterling) to depreciate over the life of the bond, unless the sterling price of the bond when converted into rupees was such as to give a higher rupee yield than the gold yield of an otherwise identical British India bond payable in gold. But, in addition to the extra silver yield he would have demanded because of his expectation of a fall in the gold price of rupees, he would have insisted upon a further premium for the *uncertainty* of the (future) value of his (future) rupee payments in terms of (future) pounds sterling—or (future) English 'money'. If, on the other hand, he had been a retired Calcutta banker having and expecting to have only rupee obligations, he would have been willing to accept a *smaller* silver yield than his forecast of a depreciation of rupees in terms of sterling would warrant. Because, in actual fact, the primary market for the sterling bonds was England and that for the rupee bonds was India and because of the peculiar monetary and trade relations between England and India, it is very hard to estimate how much or how little the 'spread' between the two yields was increased or decreased by the combined operation of the two factors, one favoring bonds payable in silver and the other favoring bonds payable in gold.

But although the case for believing in the importance of the money-of-the-market factor be extremely strong, we do not always find unequivocal statistical assurance of even its algebraic sign. It is therefore only natural that statistical evidence of the influence of the often almost supposititious forecasting factor (whether of the price of gold, of commodities in general or of a foreign money) should seldom be clear cut and unmistakable. To assume, tempting as in any particular instance it may be to do so, that the influence of price forecasting can be discovered from past rates and succeeding prices (as they actually materialized) may be quite unwarranted. To reason that, because the rates and the succeeding prices do not seem incompatible with an assumption of good forecasting, the forecasting *was* good and the rates *were* so determined may be to introduce merely a grossly *ad hoc* fictional 'as if'. But to argue that, when rates (in the light of succeeding prices) give no suggestion of *good* forecasting, they must necessarily have been determined by *bad* forecasting may well amount to the crassest of circular reasoning.

And, if to discover (except in periods of pronounced currency in-

flation) unequivocal statistical evidence of the mere existence of this elusive factor is often difficult, to *measure* its influence (even in such periods of pronounced inflation) is commonly found to be virtually impossible. How large or small an influence forecasting of the (paper) prices of gold and commodities (together with an almost certainly varying degree of preference for bonds payable in paper) may have had, for example, upon the (paper) prices and yields of American railroad bonds during the Civil War years of the 1862-79 inflation is certainly a 'puzzling question' even if not 'beyond all conjecture'.

Only a pale and flickering light is thrown on this question by the relative prices of gold and paper bonds. Even if we completely ignore differences in coupon rates and are extremely liberal as to differences in time to maturity, we still find it virtually impossible to discover pairs of important bonds identical or nearly identical in all respects save their media of payment. They fail to fulfill one or both of the two fundamental requirements of direct statistical comparison, identity of markets and equality of confidence in future payments.

Almost no instances occur of pairs of otherwise similar gold and paper bonds that were traded in exclusively or even nearly so on one and the same monetary market and that market alone; not merely were they bought and sold on two or more monetarily different markets but the relative importance of the various markets was usually not even approximately the same for the two bonds. Indeed, in many instances, it seems that neither bond was traded in to more than a negligible extent on the primary market of the other bond; the primary market for the paper bond being Boston or New York and the primary market for the gold bond London. The differences in assurance that the promised future payments would be met as promised seem to have been great though almost certainly unmeasurable. Contemporary newspaper and magazine articles suggest strongly that both domestic and foreign confidence that the promised gold payments of almost any specific American gold bond would be met (in gold) fell appreciably short of the confidence that promised paper payments of paper bonds of the same obligor would be met (in paper). This was unmistakably true not only of Federal bonds but also, though to a less extent, of the best New England municipal bonds.

The relative yields of such gold and paper bonds as were otherwise at all comparable seem seldom to have been grossly incompatible with

such market opinion as pictured by the financial commentators. But there were so many unmeasured if not unmeasurable factors that it is usually difficult to draw any very definite conclusions from the quoted prices. In March 1864, the Federal Government issued the '5 per cent Ten-Forties'. These bonds were payable at the pleasure of the Government after any period not less than ten years and not more than forty years from date. Both principal and interest were, by the Loan Act of 1864, payable unequivocally in gold. But, though the bonds were offered to the public at par (100) in *paper*, on the first day of offering (March 26, 1864) only \$875,000 was subscribed, the second day \$130,000 and the third day \$430,000.⁷³ On March 26, 1864, the price of greenbacks in gold ranged from 58.91 to 59.00 per 100. The gold yield of these bonds was therefore, even if they were to remain outstanding for the entire forty years, more than 8½ per cent per annum; if paid in gold at the end of ten years, the gold yield would be over 12 per cent per annum. Later, in the summer of 1864, the *paper* price of the Ten-Forties was only 109 at a time when the paper price of gold was 250. The gold price was, therefore, at that time less than 44 and the gold yield, even to the forty year maturity, more than 11½ per cent per annum.⁷⁴ The paper yields of Federal paper bonds were running high but at no such levels as these. Under the circumstances, it is difficult to say what part of the spread between the gold and paper yields was caused by distrust of the gold promises and what part (if any) was caused by the market's forecasting a rise in the gold price of paper. We must not forget that, even as late as 1869, there was no great assurance that even the 5 per cent Ten-Forties would have their *principal* paid in gold.⁷⁵ The yields of gold and paper municipal and railroad bonds present similar difficulties.

During such a disturbed period as the year 1865, for example, fluctuations in the paper price of gold, because they affected confidence in the gold promises of the government, did not affect the paper prices of Federal gold bonds in the manner in which they might theoretically be expected to do. If the yield in gold of a gold perpetuity were to

⁷³ *Hunt's Merchants' Magazine*, April 1864, p. 303.

⁷⁴ The complete lack, at this time, of British confidence that the American Government gold bonds would actually be paid in gold is seen in the fact that, in July 1864, the gold 6 per cent Five-Twenties of 1882 were offered in London at 49 gold while 50 gold was being bid for New York Central 6 per cent *paper* bonds of 1883.

⁷⁵ See *Commercial and Financial Chronicle*, March 20, 1869, p. 257, column 2.

remain constant, its price in gold would remain constant and therefore its price in paper would be a constant multiple of the paper price of gold. But if, whenever the paper price of gold declined, confidence that the bond would remain on a gold basis increased, the paper price of the bond would not decline as much as the paper price of gold; indeed, if the increase in confidence were sufficiently great, the paper price of the bond might even advance. Now the year 1865 was a year of rapidly declining paper prices of paper bonds and rapidly, though less uniformly, declining paper prices of gold. But from December 31, 1864 to March 1, 1865 the paper price of the Ten-Forties rose from $101\frac{3}{4}$ to $102\frac{3}{4}$ while the greenback price of gold was declining from 226 to 200. And, though the price of the bonds declined from $102\frac{3}{4}$ on March 1, 1865 to $91\frac{1}{2}$ on March 22 while the greenback price of gold was declining from 200 to 157, it advanced to 95 on May 17 though the greenback price of gold had in the meantime declined further to 130. By November 25, the paper price of the bond had declined to 91 though the paper price of gold had advanced to 147. But, even after this decline, it was, relatively to the paper price of gold, much higher than it had been at the beginning of the year. The paper yields of American railroad bonds were during the year 1868 only a shade lower than the peak yields of 1865, but confidence that the Ten-Forties would be paid and paid in gold had increased so much (it would seem) that during that year they sold as high as $109\frac{1}{8}$ (paper) and never below 100 (paper) even though the greenback price of paper went down as low as $132\frac{1}{8}$.⁷⁶

⁷⁶ The movements of the prices of many Federal bonds suggest that confidence that promised payments of principal in gold would actually be kept tended to increase as maturity approached and no adverse governmental action occurred. On January 26, 1866, the Federal gold 6's of 1847 (due in 1867) sold at $123\frac{3}{4}$ in paper with gold at $139\frac{3}{4}$, but thirteen months later (February 27, 1867), with gold at the same price, the paper price of the bonds had risen to 135.

It is, of course, in a case like this, extremely difficult if not quite impossible to estimate at all accurately the separate effects of increasing confidence in the gold promise, possible (bad) forecasting of the price of gold, preference and possibly changing preference for bonds payable in the money of the market, varying relative influence of the New York and London markets, etc.

We must remember that an American who wished paper rather than its gold equivalent but who bought the bonds because he expected the paper price of gold to advance or at least not decline appreciably would have faced a very serious paper loss if the premium on gold had virtually disappeared before the maturity of the bond; though an English purchaser would have been completely unperturbed by such an eventuality.

The great fall in the (paper) yields of American railroad paper bonds during 1862 and the abnormally low levels of those yields during 1863 and 1864 might easily suggest that the railroad bond market was at that time forecasting an imminent and prolonged fall in the paper price of gold, or commodities, or both gold and commodities. But one of the difficulties of this assumption is that, during the period in which the paper price of gold (and of commodities) was rising most rapidly and a forecasting of an imminent decline would therefore seem psychologically most improbable (paper) yields were falling—reaching their lows in July 1864, the peak month for the paper price of gold (six months before the peak month for commodity prices). Of course, it is barely possible that, unwarranted as it may seem to have been, the financial community was, during this period of rapid depreciation of the currency, actually expecting a speedy fall in the paper price of gold (and commodities) and operating on that expectation.⁷⁷

But, if this were true, why did (paper) yields begin to rise sharply as soon as the peak in the paper price of gold was passed and the expectation of a fall in its price became really warranted? It would, of course, be quite understandable that they should have risen if the impending fall in the prices of gold and commodities had all along been fairly accurately foreseen. And, in the sense that the price future proved not inconsistent with a probably unwarranted but possibly existent general expectation, they may have been 'foreseen'. But even this seems rather hard to believe—much like being asked to take seriously the prophecies of Nostradamus.⁷⁸

⁷⁷ See Wesley C. Mitchell, *A History of the Greenbacks*, pp. 369 and 370.

"Nor . . . is it surprising that business men failed to see what was coming; for the course of prices depended chiefly upon the valuation set upon the greenbacks, and this valuation in turn depended chiefly upon the state of the finances and the fortunes of war—matters that no one could foresee with certainty. Indeed, there was much of the time a very general disposition to take an unwarrantedly optimistic view of the military situation and the chances of an early peace. Many members of the business community seem to have felt that the premium on gold was artificial and must soon drop, that prices were inflated and must collapse."

⁷⁸ The yields of some of the bonds in our list would seem to suggest that there possibly was a real forecast of an even more rapid return of paper to a par with gold than actually occurred. For example, the Pennsylvania Railroad *Second Mortgage 6's due in 1875* (Bond Number 9) sold at lower yields than the *First Mortgage 6's of the same road due in 1880* (Bond Number 10) every month from March 1864 to August 1864 inclusive. Though, of course, all that this fact could logically be

Before leaving these puzzling Civil War years, it is desirable to remind the reader that, even if it could be known that the movements of American railroad bond yields during the years 1862-65 inclusive were as they were largely because of conscious gold or commodity price forecasting (which, whether accidental or not, would have been *good* forecasting); that fact would not help us to explain why, as for example during the period 1916-21 for commodity prices and 1917-22 for railroad bond yields (see Chart 18), bond yields and commodity prices should ever be *positively and not negatively* correlated—unless we are willing to introduce the *deus ex machina* of *bad* forecasting.

But 'much study is a weariness of the flesh. Let us hear the conclusion of the whole matter'. In the first place, the absence of a really persistent and uniform statistical relation between the series suggests strongly that, even if the one series be to a greater or less extent dependent on the other, the very nature of that dependence may vary. For example, forecasting may be a negligible or an important factor and, if important, may be good or bad. Thus, it is at least possible that railroad bond yields were low during the high gold and commodity prices of the Civil War because a great fall in prices was, whether warranted or not, being commonly expected; and high during the high commodity price period centering round 1920 because of conditions caused by the rise of prices but quite unrelated to (bad) forecasting.

Of course, even in a period of uncontrollable inflation, high rates and yields may be only partly the result of a sheer 'corned beef and cabbage' complex. We must remember, for example, that during the panic of such a period, with the increasing rapidity of circulation, commodity prices rise faster than the volume of the circulation and an intense money shortage therefore occurs. But, even with such refinements, it is not very difficult to understand why rates and yields should be high in such a period. If forecasting be assumed to occur, (Footnote ⁷⁸ concluded)

made to signify, if (in spite of the results of our examination of the relative yields of serial bonds in the present century) we assumed that the relation between the yields of the two bonds was methodically considered, is that buyers and sellers felt that the paper yield of the bond with the shorter maturity should, for the period terminating March 31, 1875, be lower than the paper yield of the bond with the longer maturity for the period March 31, 1875 to December 31, 1880. But, in view of the bond with the longer maturity being a *First* mortgage bond and the bond with the shorter maturity only a *Second* mortgage bond, even this is curious enough.

both its direct and its indirect influences can be relatively easily analyzed.

But it is much more difficult to see why and how rates or yields should be affected by price levels or price changes during periods in which forecasting would seem to be a quite unimportant factor. The suggestion that, though there be periods in which conscious forecasting is negligible, there are no periods in which unconscious forecasting is unimportant, that when prices are rising the common though unconscious forecast is that they will continue to rise, is not as helpful as one might expect it to be. At best it offers an explanation of a usually non-existent condition. To the extent that the problem suggested by the statistics may be a real problem at all, it is why, in spite of numerous and glaring exceptions, rates to some extent and yields to a much greater extent are so often high when prices are high and low when prices are low or rise and fall with prices, not why they are high when prices are rising and low when prices are falling. And no question-begging description of rates or yields as 'viscid' or 'sticky' is more enlightening than the old explanation that a body was hot because it contained much phlogiston. Even if such a physical analogy as the concept of 'stickiness' were thoroughly warranted, the question would still remain, *why* are rates and yields sticky?

If the movements of commodity prices ever affect the movements of interest rates and bond yields *directly*, in other words if the two series are ever, in the absence of conscious forecasting, more closely related to each other than as two aspects of some more fundamental condition, I suspect that the mere *existence* of long term debts (such as are represented by bonds), with rigid future interest obligations, is an extremely important factor in bringing about this result.

During a pronounced rise in commodity prices, though it may lead to an increased logarithmic 'scatter' among the prices, there is a pronounced tendency for the prices of nearly all things to rise. Though wages lag, even they eventually rise. *But (aside from the resumption of payments on debts in default) interest payments on unmatured debts do not rise.* Now this condition may possibly have an extremely important influence on rates and yields. After a rapid commodity price rise of one hundred per cent, the prices of the products of industry (except of those industries in which selling prices are determined by law) will, in general and as an average, have

doubled, *but the burden of debt will remain virtually unchanged.* Relatively to prices that burden will, therefore, have been halved. The market value of all plants (that do not have the prices of their products determined by law or custom) will, therefore, in general (ignoring depreciation and obsolescence) have at least doubled and that of going businesses more than doubled. *The ability of business to borrow will be greatly increased—much more than doubled.* And the urge to borrow will also be greatly increased; not merely because the volume of new loans necessary to continue the business at its old pace will have risen with the price level but also because the price rise will probably be associated with a rise in the prospects for profits and hence few businesses will be satisfied to continue operating at the old pace.

But there will be no corresponding increase in the ability and willingness to lend. Not merely will the bond income of existing bond holders remain unchanged but the prices of those things for which they used to spend that part of their income which they did not invest will have doubled. This great source of demand for new bonds will therefore, instead of increasing, actually decrease. Similarly with the (of course less important) demand for bonds from wage and salaried persons. Their incomes will not have kept pace with prices. There remains the great class of stockholders and business entrepreneurs. But the business entrepreneur will, during such a period, be expanding his business. And his silent partner, the stockholder, will tend indirectly to do likewise. An even larger percentage of his income than usual will go back into 'the market'. *Either directly or indirectly, both the active and the silent partners will be increasing their borrowing more than their lending.*

Moreover, as commodity prices rise and the burdensomeness of corporation debt declines, second and third grade bonds become first grade. *The volume of bonds of the highest grade therefore increases even more rapidly than the increase that results merely from new issues.* And it is the possible relation between commodity prices and the yields of these highest grade bonds that the hypothesis would attempt to explain.

But 'intriguing' as this all sounds, the hypothesis is almost as difficult to reconcile with parts of the record of actual rates and prices as are some of the theories upon which we have so adversely commented. If the long time major movements of prices and rates are ever causally

related, the 'mere existence of long term debts' may, as I am inclined to suspect, be an extremely important factor—without being the only factor needed for a complete solution of the problem of why and how they are related. *Entia non sunt multiplicanda praeter necessitam* rules only that causes are not to be multiplied *beyond what is necessary*.

CHAPTER VII

FACTUAL LEADS AND LAGS AND EMPIRICAL FORECASTING

THE movements of the various individual series from 1856 to the present, and the similarities and dissimilarities of those movements are graphically presented in the charts scattered through this volume. The figures there depicted are presented in Appendix A. Better than in any mere text the reader will find in the tables, and especially in the charts, a clear picture of what has happened to short term interest rates, bond yields, stock and commodity prices and physical and monetary trade volumes in the United States during the last seventy-nine years.

The different trends are collected and presented in Chart 29. An examination of it and of the various charts on which data and trend curves appear together shows that the trends differ noticeably with respect not only to the rates of advance or decline but also to the possibility of their being adequately described by a mathematical equation representing a curve of clean-cut sweep.

Pig iron production and deflated bank clearings outside New York City suggest that their long movements could be represented by 'growth' curves of some kind or other;¹ railroad stock prices give a much less definite mathematical suggestion. The periods during which the line joining the data points does not intersect the trend line are much longer and the arrangement of its deviations around the trend line is much more irregular. Finally, in the collapse that began in 1929 those prices acted in such a manner as to suggest that they may never again even touch the old trend line. The trends of short term interest

¹ The mathematical equation used to describe the trend of pig iron production was fitted to the data fifteen or sixteen years ago. Upon taking up the series for the purposes of this book, we decided to use the curve already fitted, not only because it had remained so astonishingly good but also because of the interest attaching to it as an illustration of how growth curves seem sometimes to be more than mere fits to existing data.

rates, bond yields, and commodity prices are still less suggestive of any 'growth' or other simple mathematical curve. The trend lines were obtained by 'smoothing' and not by 'fitting', and the appearance of both the smoothings and the raw data suggests strongly that this was the only defensible procedure.

Chart 29 is presented to show the relations between the long term or 'trend' movements of the various series. It is composed of the various 'trend' graduations. The first thing that will strike the reader is, as we have said, that these lines do not appear to be true 'trends' at all. They do not have the single, simple sweep of such trend curves as are represented by the mathematical equations fitted to deflated bank clearings outside New York or to pig iron production. Each line, even those representing the deflated bank clearings and the pig iron series, shows more or less pronounced long term sinusoidal or wavelike movements. This is accounted for by the fact that, while the 'trend' graduation that we have used eliminates all the so-called ordinary 'business cycle'—ranging in length up to about four or four and a half years—it does not eliminate all the longer waves that appear in the data. The difficulty encountered in any such procedure as we have engaged in is to obtain a 'trend' line that will, as far as possible, show each 'cycle' as working definitely back and forth across such a line and, at the same time, eliminate as long cycles as possible. We may have erred in not choosing a formula that would have more of a dampening effect on the longer cycles—though such a formula has its own disadvantages. However, since we present the whole story not only graphically but also by means of tables, the reader may form his own opinion whether, in any particular instance, our conclusions might have been somewhat different if we had used a different 'trend' graduation. Call money, time money and commercial paper show the most pronounced of these long term wave movements—long term 'cycles' we might call them, if we did not wish to save that word for somewhat shorter movements. The amplitude of the long term wave movements becomes less as we pass from call money to rates on loans of longer duration, time money and commercial paper. In the bond yields line they almost disappear. That line is more like a typical 'trend'. The opposite movement in the trend lines for railroad stock prices and bank clearings in New York City from 1914 to about 1919 is rather striking, if we consider how closely the two curves move together

in other periods. The history of the railroads in that period was, of course, exceptional—as the chart indicates.

On examining Chart 21 the reader will notice that the 'cyclical' movements of the series have as marked peculiarities as their trends. The first difficulty he will encounter, although he is examining smooth curves and not raw data, is to decide what he should call a 'cycle'. He will soon see that it is not sufficient to define a cycle merely as a portion of the curve that lies between two maxima (or minima). Not only will he note that maxima and minima may appear in a curve representing deviations from a trend when they do not appear in the original data but also he will begin to feel that the end points of a cycle are not necessarily either maxima or minima. In some instances the suggestion will be strong that, even though there be no maximum or minimum point, there is an end point that lies between two points of inflection. A point at which the second derivative is a maximum or minimum (the third derivative zero) often lies on a date that it would seem reasonable to take as a dividing line between two 'cycles'. Not only the appearance of the preceding and succeeding portions of the smooth curve itself but also the relation of the date to the dates of maxima or minima in other series may tend to confirm such a decision.

However, the reader dare not allow any such mathematical considerations to outweigh his calm judgment concerning the type of 'cycle' he is interested in, or he may find himself with several 'cycles' each covering less than a twelve-month period. He must reject very short period cycles of negligible amplitude, especially if they occur between two points that are neither maxima nor minima even though their third derivatives equal zero. But he will find it very difficult, if not impossible, to formulate mathematical rules to guide him in the process of elimination.

The second difficulty he will encounter is closely related to the first. Even in the same series all 'cycles' are not equally clear cut, and even when equally clear cut, they are not equally important. The variation in amplitude between a cycle of pig iron production covering a period of world-wide industrial collapse and one that is revealed only through mathematical analysis may for most purposes be considered a difference in kind rather than merely in degree.

Finally, struggle as the observer may to decide what are the cycles

in his various series, he will find that some series undoubtedly have a larger number of definitely defined cycles than others. This is, of course, not surprising, though seldom recognized. Everyone knows that some economic series show pronounced seasonal cycles that are totally or almost totally lacking in others. And this brings up the subject of the attempts that have been made to discover mathematically regular 'business cycles'.

Virtually all 'cycle theorists' unconsciously assume that it is possible to discover the dates on which 'cycles' begin and end and also that, in any particular period, there are the same number of cycles for each important economic series.

Nearly all the earlier and cruder efforts contained the further implicit assumption that there were no 'interferences' in the 'cyclical' movements. At any one time there was only one cycle. The picture was always that of a huge ground swell on a glassy sea rather than the choppy waves where two currents meet, or even the ordinary picture of small waves superimposed on larger ones.

The possibility that the amplitude of the cycles might vary was not discussed or even considered. Periodicity was the only concern of the writers. A ten-year cycle was a ten-year cycle if ten years intervened between two 'crises'. It mattered not whether, during the intervening years, there had occurred a boom that would go down in history, like the Mississippi Bubble, or merely such a negligible degree of prosperity that it was difficult to say when the terminating crisis began.

The proponents of rigid mathematical cycles early tended to base them on, or at least relate them to, astronomical periodicities. Two great astronomical cycles had been recognized before the dawn of history, indeed before the advent of man. The lives of even the lower animals were subject to the domination of day and night and the sequence of the seasons. It was almost inevitable that with the discovery of the 'sunspot' cycle, this longer solar cycle would soon be used by the economists. Its relation to terrestrial magnetism began to be investigated early in the nineteenth century; by the third quarter of that century 'sunspottery' was breaking out in economic circles. It was a period in which the cyclic idea was budding everywhere. The files of the English periodical *Nature* are full of suggestions; 7-day, 30-day weather cycles, 4-year, 8-year, 10-year, 16½-year, 19-year,

21-year, 33-year, 35-year, and 400-year weather cycles were all to appear.

About 1862 Professor W. Stanley Jevons came to the conclusion that the dates of the preceding five English economic disturbances (1815, 1825, 1836-39, 1847 and 1857), which averaged 10.5 years apart and in each instance were extremely close to this normal interval, contained the clue to some mathematically exact nature cycle. His first attempts to correlate these figures with sunspot maxima and minima were disturbed by the fact that the sunspot cycle was at that time held to be about 11 years and not 10.5. When, however, Mr. J. A. Broun in 1877 came out with the statement that the true mean interval was 10.45 and not 11.1, Jevons' fate was sealed.² He seized upon Broun's 10.45 figure with highly unscientific avidity and from that time (1877) became almost unbalanced in the ardor with which he fitted facts to his theory.

A couple of years previous, in 1875, he had examined and discussed the data in Thorold Rogers' *History of Agriculture and Prices in England since 1259*. He then believed, he tells us somewhat naively, that "he had discovered the solar period in the prices of corn and various agricultural commodities", and he accordingly read a paper to that effect at the British Association in Bristol. "Subsequent inquiry, however, seemed to show that periods of 3, 5, 7, 9 or even 13 years, would agree with Professor Thorold Rogers' data just as well as a period of eleven years," to quote Jevons' own words, and in disgust at this result he withdrew the paper from further publication.

J. A. Broun's 10.45 mean interval, however, prevented any such continued discouragement with the theory, as we witness in 1875. By November 1878 we have an article by Jevons in *Nature* (November 14, 1878, pp. 33-7) on Commercial Crises and Sun-spots, another article early in 1879 on the same subject, and in February 1879 we have a serious attempt at correlating *Sun-spots and Plague* which exhibits almost pitifully the extent to which Jevons was then outraging his own great intelligence.

An interesting feature of his article on *Sun-spots and Plague* is that Jevons suggests the correlation of plague and Asiatic famine. In view of this suggested correlation it is of some significance to note that in this article the incidence of plague (and hence of Asiatic famine) is

² 11.1 is closer to the modern figure than is 10.45.

supposed to coincide with sunspot *maxima*, whereas in his later articles on sunspots and commercial crises, commercial crises are synchronized with sunspot *minima* and at the same time with Asiatic famine.

In general, Jevons compared imagined or real crises not with sunspot maxima or minima but with dates, when, under Broun's discredited average, sunspot maxima or minima *should* have occurred—but did not—and this in the face of the fact that he had access to the data of actual observations tabulated by Wolf. Taking Jevons' own list of crises in order and comparing them with the closely-known epochs of maximum and minimum sunspot frequency, we obtain the following results: The doubtful (we should say 'assumed') crisis of 1701 followed a spot minimum by three years and preceded a maximum by four and one-half; the crisis of 1711 (predicated by Jevons merely because the South Sea Company had been *founded* in that year) followed a minimum by five and one-half years and preceded a maximum by one year; the South Sea Bubble of 1720 (Jevons places the date at 1721) followed a maximum by one and one-half years and preceded a minimum by three and one-half; the imagined crisis of 1731–32 preceded a minimum by two years; 1742 (no crisis known) preceded a minimum by three years (the joker here is that 1745 was a year of both minimum sunspots and panic—December 6, 1745, when there was a run upon the Bank of England due to fear engendered by the progress of the army of the Young Pretender—but Jevons refuses to notice this because he refused to accept Wolf's sunspot figures, seemingly because they did not check with his preconceived ideas); 1752 (no crisis) followed a maximum by two years and preceded a minimum by three; 1763 came *exactly* half way between a maximum and a minimum; 1772 came two and one-half years after a maximum and three and one-half years before a minimum; 1783 preceded a maximum by two years; 1793 came just half way between a maximum and a minimum; 1804–05 (no known crisis) coincided with a *maximum* (not a minimum); 1815 preceded a maximum by one and one-half years; 1836–39 included the year 1837 of *maximum* solar activity, that being also a year of panic in the United States); 1857 followed a minimum by one year; 1866 preceded a minimum by one year; 1878 was a minimum sunspot year. The dates of later crises reveal similar lack of agreement with the sunspot cycle.

The nadir of sunspottery was soon reached. In an article in the

May 1872 issue of *Nature* we find a certain B. C. Jenkins stating that "cholera epidemics have a period equal to a *period and a half* of sun-spots"! Henry Jeula in 1877 made a careful and laborious attempt to correlate sunspots and the number of wrecks posted each year in Lloyd's loss book—(based upon the assumed correlation of sunspots and East Indian hurricanes). By March 1879 he came to his senses, however, and in the *Journal of the London Statistical Society* of that date we have an oasis in the desert of nonsense that was being written by unscientific 'country gentlemen'. He made a most brilliant success of correlating Oxford-Cambridge boat races and sunspot maxima and minima. To quote from his article: "A cycle is believed to consist, as nearly as can at present be ascertained, of about eleven years, of which the 1st, 2d, 10th, and 11th form the minimum sun-spot group, the 3d, 4th, 8th, and 9th the intermediate groups; and the 5th, 6th and 7th the maximum group. Of 12 races rowed in the minimum group, Oxford won 66 per cent; of 10 races rowed in the maximum group, Cambridge won 60 per cent; while of 16 races rowed in the intermediate sun-spot group of years, each university won exactly half."

Modern cycle theory has availed itself of the mathematical apparatus of harmonic analysis. The flexibility of a Fourier series is as great as that of a power curve or higher parabola but, unless the essential nature of the data is periodic as is the case with such physical phenomena as heat, light, sound and electricity, the resulting mathematical descriptions or 'fits' are purely empirical. It is extremely easy to describe almost any time series by means of a set of superimposed sine curves of different periods and amplitudes but it is quite another matter to be able to describe data (whether future or not) that were not used in obtaining the constants. What shall we say of a mathematical 'law' that by its nature can be used to describe only those observations from which it was itself derived?

The mathematically exact economic cycles presented—before the onset of the depression of the 1930's—by some modern economists and accepted by many modern business men merit little if any more favorable consideration than we have given to the pronunciamientos of Jevons. We intend to save space and preserve friends by not discussing them. In the charts of this book the reader has before him abundant material to come to a conclusion about any of them—if he

does not do what Jevons and so many of his modern representatives tend to do, call a rain storm a flood if by so doing it will seem easier to float a theory.

While but few economists believe that business prosperity comes and goes like day and night, or even rises and falls with the regularity of the tides—complicated as are the mathematics involved in lunar theory—there are probably even fewer who believe that either prosperity or depression is an accident that befalls the body politic. Dr. Mitchell's theory that the essence of 'business cycles' is to be found in the fact that the conditions attendant on each phase of the 'cycle' tend to bring on, sooner or later, the next phase has become almost universally accepted. That theory is sharply separated from the mathematically exact cycle theories by its emphasis on the indefiniteness of the timing, and from the accident theories by its emphasis on internal causation.

And this internal causation tends to show itself in leads and lags among important economic series. But the reader must not expect always to find a high degree of regularity in the relations among the various series or he will be badly disappointed. The uniformity is often rather specious. It sometimes amounts almost to an optical illusion. The general rule is that there is no rule. In all cases (aside from such essentially similar data as the various short term money series) irregularity is an outstanding characteristic. Often it is the outstanding characteristic. While a cursory examination of such a chart as number 21 might give the impression of extreme regularity in the sequences of and relations among the various series, more careful study will disclose a high degree of irregularity. For example, if the series should be thought of as having typical time lags, it is extremely difficult to say what they are. Sometimes a maximum or minimum sweeps across the chart in a startling manner, the various lags being clear cut and unmistakable. On the other hand, the entire picture is often quite obscure. Arithmetic averages of the amounts of lag are very treacherous. The inclusion of a single doubtful case may appreciably affect the result. Medians might be thought to be more suitable than arithmetic averages in such a case, but the essential feature of the data is that any type of average will involve making some questionable decisions. Moreover, the 'scatter' around the average—the 'deviations' from the average or typical lag—are extremely large in all

CHART 70
AMERICAN RAILROAD BOND YIELDS AND SHORT TIME INTEREST RATES IN NEW YORK CITY

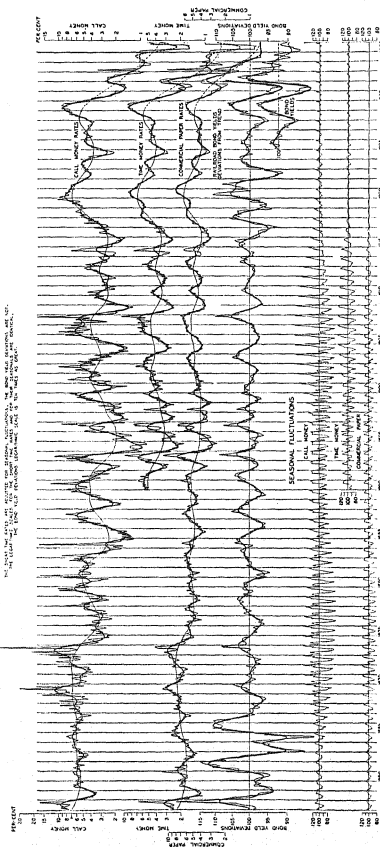
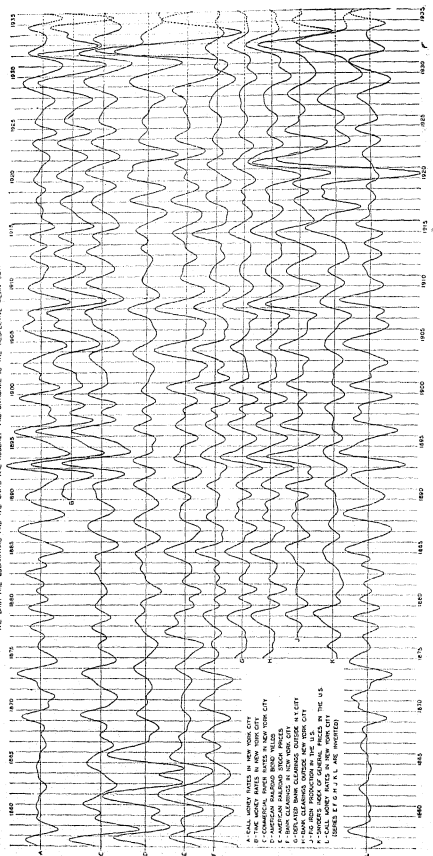
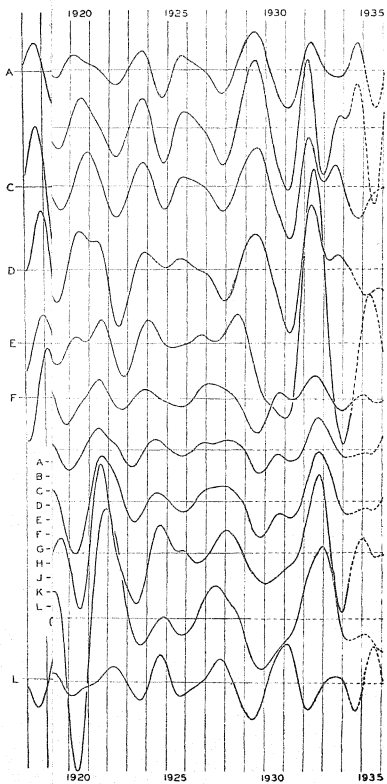
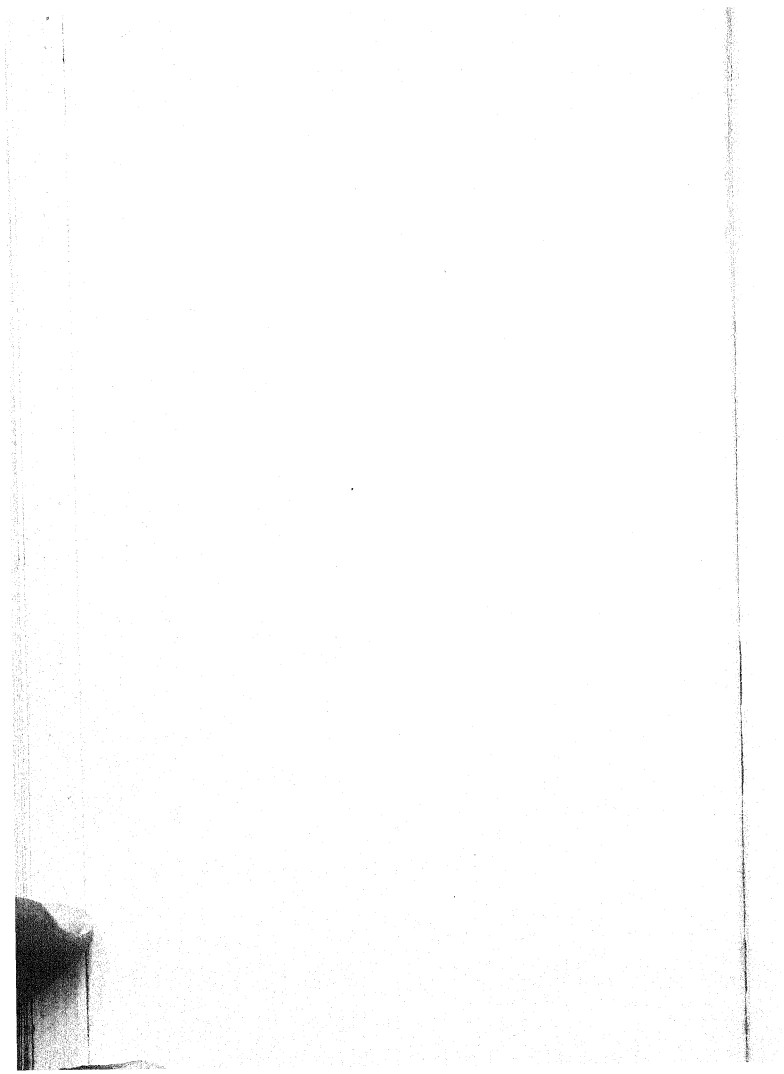


CHART 21 CYCLICAL MOVEMENTS OF INTEREST RATES AND OTHER ECONOMIC SERIES

THE CHARTS BELOW ARE DIVISIONS OF SEASONAL-ELIMINATING QUARTERS FROM CYCLE-ELIMINATING TREND LINES. THEY REFLECT THE PERIODIC REPRESENTATION OF THE DATA. THE ADVISORS ONLY SEE TEXT IN THIS CHAPTER. THE DATA ARE LOCATIONS AND THE UNITS ARE INDICATED IN THE APPROPRIATE LEGEND.







but closely related series. Any great degree of confidence in the 'accuracy' of any averages is entirely unwarranted. They may well be more misleading than enlightening.

Even series A, C, D and E (of Chart 21),³ which are quite closely related, show many startling irregularities, as the reader may see if he will check up the following 'average' lags⁴ with individual instances. The average lags in these four series run roughly⁵ as follows. A high in call money rates precedes a high in commercial paper rates by about 2 months, a high in railroad bond yields by about 4 months and a *low*⁶ in railroad stock prices by about 5 months. A high in commercial paper rates precedes a high in bond yields by about 2 months and a *low* in stock prices by about 3 months. A high in bond yields precedes a *low* in railroad stock prices by about 1 month. The lows do not show the same set of lags. A low in call money rates precedes a low in commercial paper rates by about 2 months, but a low in bond yields by about 6 months and a *high* in stock prices by about 9 months. A low in commercial paper rates precedes a low in bond yields by about 4 months and a *high* in railroad stock prices by about 7 months. A low in bond yields precedes a *high* in stock prices by about 3 months.

The characteristics of the various lags are clear on Chart 21, which presents the cyclical movements of ten of the most important series presented in this book:

- A Call money rates, January 1857 to January 1936
- B Time money rates, January 1890 to January 1936
- C Commercial paper rates, January 1857 to January 1936
- D Railroad bond yields ('lowered' index), January 1857 to January 1936
- E Railroad stock prices, January 1857 to January 1936
- F Bank clearings in New York City, January 1857 to January 1936
- G *Deflated* bank clearings outside New York City, January 1875 to January 1936

³ Series B—time money rates—is here omitted because it has been used only as far back as January 1890.

⁴ The condition is only slightly improved if the long period from January 1857 to January 1936 be broken up into shorter periods. Moreover, where improvement is possible it is often artificial and unreal—resulting from fitting to too few cases.

⁵ Greater 'accuracy' than here presented is merely misleading.

⁶ On the chart, series E is inverted. We are discussing it as though it were not inverted.

- H Bank clearings outside New York City, January 1875 to January 1936
- I Pig iron production in the United States, January 1877 to January 1936
- J Carl Snyder's index of general prices, January 1875 to January 1936
- K Call money rates, January 1857 to January 1936

Series E to K inclusive are inverted on the chart. The relations among the various series stand out sharply. Indeed, the reader may, as we have already said, easily be tempted to believe the regularity of movements and sequences greater than it really is. While the first three series (call money, time money and commercial paper rates) are very closely related, even here the lags are less uniform than a cursory inspection of the chart might lead one to suppose. For example, while commercial paper maxima on the graduations tend to occur about two months later than call money maxima, the range is all the way from two months earlier to ten months later. Similarly, while the commercial paper minima tend to occur about two months later than the call money minima, the range is from two months earlier to eight months later. A similar analysis of series that are less closely related shows even less regularity of movements and lags. The technical reasons for this condition are traceable not merely to the fact that the amounts of lag between definite maxima or minima, which on the chart appear unmistakably related, vary considerably, but also to the fact that it often is rather difficult to say just which maxima or minima should be considered together. The actual number of maxima or minima is not the same for each series. Call money rates have more maxima and minima, and hence more 'cycles', than railroad bond yields. Sometimes we have no actual maximum or minimum but do have a distinct pair of 'points of inflexion'. Shall these be used as though they contained a maximum or minimum point (we have not done so), and if so, what procedure should be followed to date such a point? Sometimes a maximum or minimum that appears distinctly on one series appears on another series as only a 'bulge' between two points of inflexion. In still other series it may not appear at all. For example, the minor maximum in call money rates in 1901 is suggested in time money, absent in commercial paper and railroad bond yields, suggested in railroad stock prices, clear cut in New York bank clearings, absent

in deflated bank clearings outside New York, suggested in undeflated bank clearings outside New York, present in pig iron production and clear cut in Snyder's index of general prices.⁷ The reader can easily spot similar and even more startling irregularities. Interesting and instructive as Chart 21 may be, to discuss its mere graphic peculiarities in any lengthy manner seems unnecessary. It speaks for itself.

However, there is one series whose order in the chart may disturb the reader—bank clearings in New York City. In general the order of movement of the series, as presented in the chart, is:

- (1) Short time interest rates *decline*.
- (2) Long time interest rates *decline*.
- (3) Stock prices *advance*.
- (4) Physical volume of business *advances*.
- (5) Monetary volume of business *advances*.
- (6) Commodity prices *advance*.
- (7) Short time interest rates *advance*, etc.

Now bank clearings in New York City move earlier than the physical volume of business as represented by such series as *deflated* bank clearings outside New York City or pig iron production. The reason for this condition may be found in the fact that such a large percentage of the New York clearings are of a financial origin—tied up with groups 1, 2 and 3 above. The volume-of-business series that contain the price element move later than *truly corresponding* series that do not contain it. This is illustrated by bank clearings outside New York City—deflated and undeflated. Finally, we must remember that all the sequences may be reversed. This is illustrated by call money which is presented as the top of the chart and also as the bottom line—in the latter case inverted.⁸

The reader who wishes to examine the actual series rather than the graduations may do so in other charts and in the tables in Appendix A. After all is said and done, the graduations are intended merely to make the interpretation of the series easier, not to replace them. The

⁷ At the end of 1901.

⁸ Our method of deciding which sequence was best for graphic presentation has already been described. It was based on the two considerations of length of lag and contour of the graphs. Similarity of contour would suggest that the sequence was more important when so lagged than when lagged in an opposite sense.

raw data for the first three graduations of Chart 21 (call money; time money and commercial paper) may be examined in Chart 20. On that chart are presented the raw data (after adjustment for seasonal fluctuation), and 'cyclical' and 'trend' graduations; also the deviations of the data and of the 'cyclical' graduation of bond yields from the 'trend' graduation of the same series. The seasonal fluctuations of the three short term rates are presented at the bottom of the chart.⁹

The raw data for the fourth and the fifth graduations presented in Chart 21 (railroad bond yields and railroad stock prices) are presented in Chart 14, which gives, for each series, the raw data and the 'cyclical' graduation. The figures are given in Appendix A, Table 10, Columns 5 and 6.

The raw data for the fourth, sixth, seventh, eighth and ninth graduations of Chart 21 (railroad bond yields, bank clearings in New York City, deflated bank clearings outside New York City, undeflated bank clearings outside New York City, and pig iron production) are presented in Charts 22, 23 and 24.¹⁰ Chart 23 gives each of these series in the form of the data and their 'cyclical' graduation. Mathematical curves fitted to deflated bank clearings outside New York City and pig iron production are given to illustrate how well the 'trends' of such series may be represented by ordinary mathematical equations (see Chart 22 and Chart 23). Chart 24 presents (for deflated bank clearings outside New York and pig iron production) the deviations of the data and of the 'cyclical' graduations from such fitted mathematical curves. This chart also presents railroad bond yields in the form of (1) the raw data, (2) the 'cyclical' graduation, (3) the 'trend' graduation, (4) the deviations of raw data and of the 'cyclical' graduation, from the 'trend' graduation. The reader will find it interesting and instructive to compare the deviations of deflated bank clear-

⁹ The figures for call money, time money and commercial paper rates, unadjusted for seasonal fluctuations, are given in Table 10 in Appendix A. Graduations and seasonals for these series are presented in Tables 21, 22 and 23.

¹⁰ The figures for bank clearings in New York City, deflated bank clearings outside New York City, (undeflated) bank clearings outside New York City, pig iron production and wholesale prices, unadjusted for seasonal fluctuations, are given in Appendix A, Table 27. The graduations and seasonals of these series are presented in Appendix A as follows: bank clearings in New York City, Table 28; (undeflated) bank clearings outside New York City, Table 29; deflated bank clearings outside New York City, Table 30; pig iron production, Table 31; wholesale prices, Table 32.

ings outside New York and of pig iron production from the fitted mathematical curves with the deviations of the same series from the 'trend graduations' (presented in Chart 21).

The raw data for Mr. Carl Snyder's index of general prices—the tenth graduation of Chart 21—are not shown on any chart presented in this book. The figures are given in Appendix A, Table 27. Monthly data (January 1890 to January 1936) for the United States

CHART 22
BOND YIELDS AND THE VOLUME OF BUSINESS

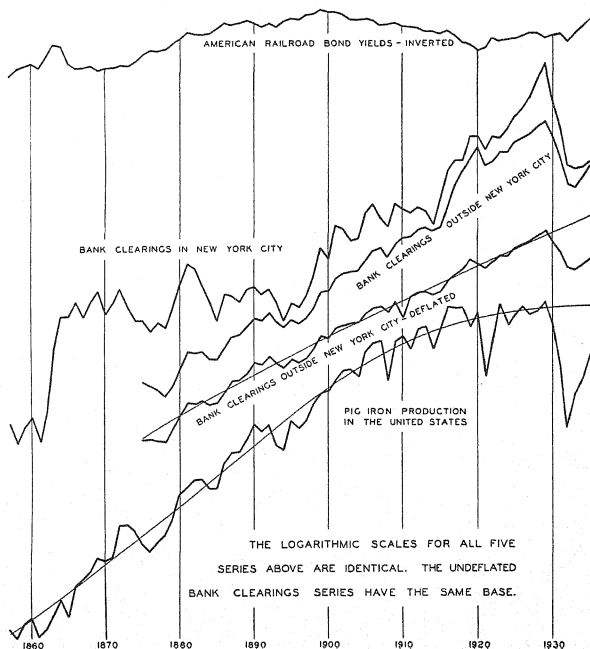


CHART 23
BOND YIELDS AND THE MONETARY AND PHYSICAL VOLUME OF BUSINESS
(LOGARITHMIC SCALES)

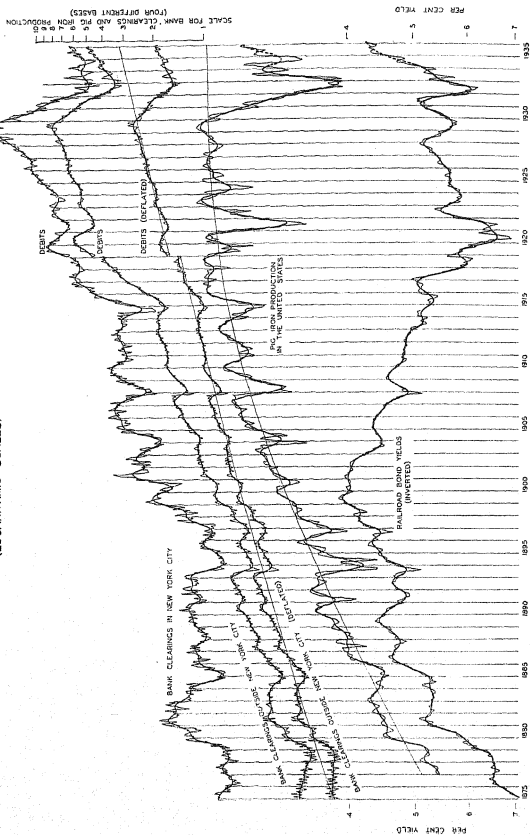
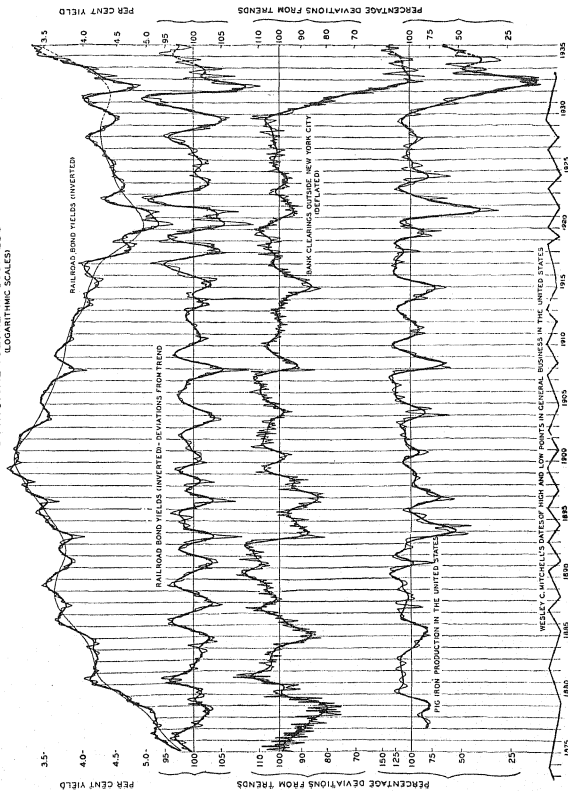
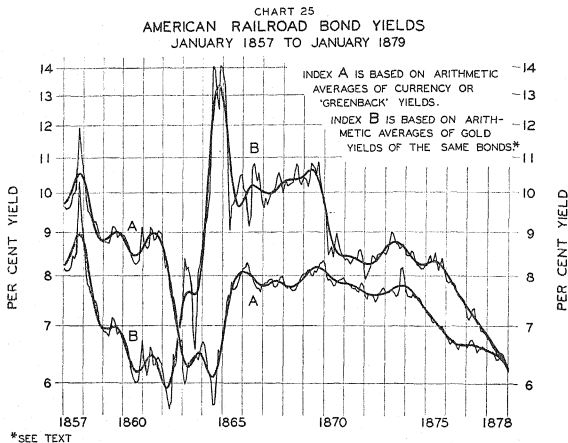


CHART 24
BOND YIELDS AND THE PHYSICAL VOLUME OF BUSINESS
(LOGARITHMIC SCALES)



Bureau of Labor Statistics index of the price of commodities at wholesale are compared with bond yields in Chart 18—the data and the 'cyclical' graduation being given for each series.

The reader who is interested in the distortions that are introduced

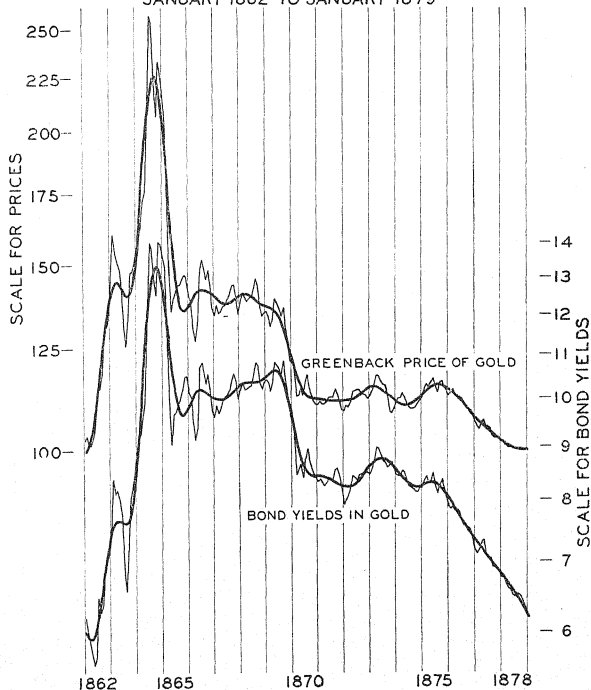


into some of the series by the paper inflation of 1862 to 1879 may examine Charts 25, 26, 27 and 28. An examination of these charts, together with the charts showing purely 'paper' data, will also illustrate how deceptive mere graphic appearances of lead and lag or correlation in general may sometimes be.

Such is the thorny path that must be trod by the professional 'forecaster'. He cannot operate on what the sequences and lags should be; he must operate on what they actually are—indefinite as a statement of that condition may be. He is interested in noting that a rise in short term interest rates or commodity prices so often precedes a rise in bond yields. He is very unlikely to be interested in hearing that if the future of short term interest rates or commodity prices were definitely known, the sequences might be different. However, such

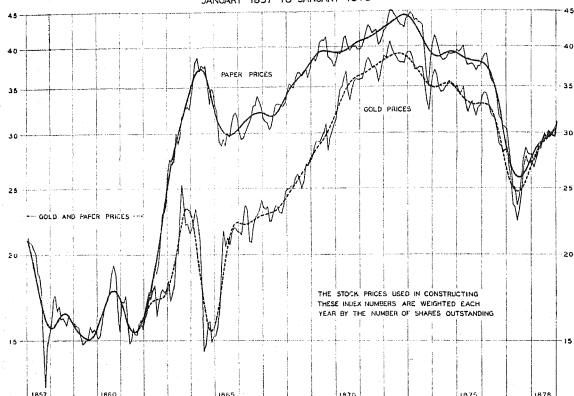
knowledge might well be of some use to him. It would be well if he always remembered that the various sequences are as they are largely because of the inadequacies of human intelligence rather than because of its triumphs. For example, in a period when general forecasting

CHART 26
GOLD YIELDS OF AMERICAN RAILROAD BONDS
AND THE PRICE OF GOLD IN GREENBACKS
JANUARY 1862 TO JANUARY 1879



happens to be unexpectedly good the usual sequences will tend to be less rather than more reliable as indicators of the future. Economic forecasting that is based on 'leads' and 'lags' is almost necessarily extremely dangerous—though it often is almost the only way to handle

CHART 27
GOLD AND PAPER PRICES OF AMERICAN RAILROAD STOCKS MONTHLY
JANUARY 1857 TO JANUARY 1879



the problem. In attempting to forecast such a series as stock prices the professional 'forecaster' commonly assumes the continuation of illogical relations between it and certain other series, and attempts to predict the future of the latter—although if their future were really known the existing illogical relations would not continue. The forecasting of the future of the 'other' series is very often attempted by means of implicit assumptions concerning the timing of a reversal in their cyclical movements, the timing of this reversal being itself dependent on assumptions concerning regularity of amplitude in the 'swing' of these 'other' series. In such methods an extremely bad condition is assumed to be a good sign, and *vice versa*. The injunction to 'buy stocks when the percentage of pig iron furnaces in blast falls below sixty'—not when the percentage is more than sixty but when

CHART 28
 INTEREST RATES AND SECURITY PRICES
 IN THE UNITED STATES
 JANUARY 1857 TO JANUARY 1879
 (IDENTICAL LOGARITHMIC SCALES)

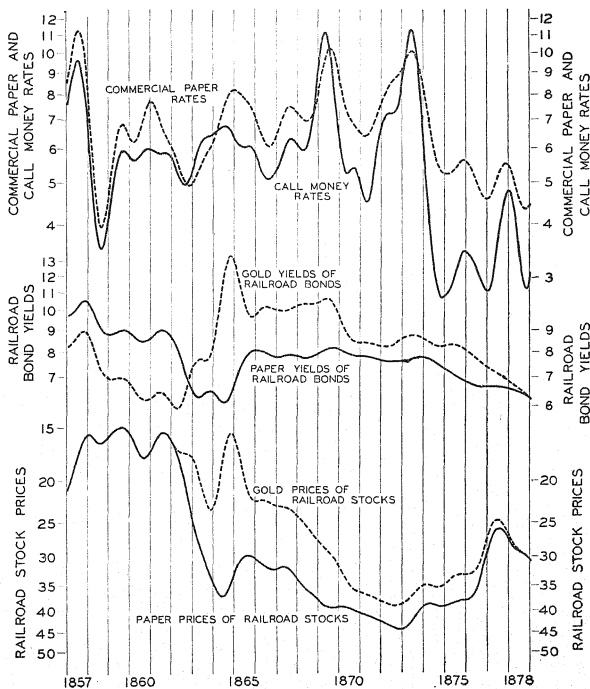
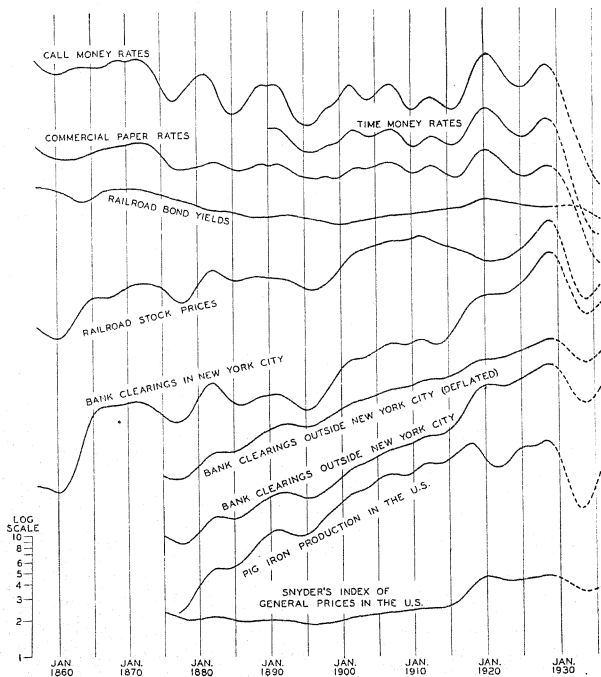


CHART 29
LONG TIME MOVEMENTS OF THE VARIOUS SERIES
AS SHOWN BY CYCLE-ELIMINATING TREND LINES

(IDENTICAL LOGARITHMIC SCALES)



it is *less*—involves the assumption that when the iron industry reaches a specified degree of *badness*, the outlook for general business (including the iron industry, of course) is, or at least in the near future will be, good. Other indices of the activity of business are used in a similar manner. When business is sufficiently bad, buy stocks; when it is sufficiently good, sell them. Even instructions such as 'sell stocks when commercial paper rates rise to $4\frac{1}{2}$ per cent', or 'sell stocks when commercial paper rates have risen $1\frac{1}{4}$ per cent', are not given primarily because of any belief that such conditions will *cause* a decline in business but simply because such a movement of rates is considered a symptom—a good indication—that business has advanced far enough to be approaching the region of reversal. The chief proponent of the $1\frac{1}{4}$ per cent rise rule adds 'when business activity is increasing'.

However, the study of relations among economic series is at least more promising than the attempt to develop rigid cyclical formulas on the basis of one or more individual series. The 'lags' of the various series are less irregular than their cycle lengths though even here we find anything but mathematical regularity. The irregularities seem traceable to two causes. In the first place the relationship between any two series is seldom self-contained. Movements of pig iron production are not determined by movements of general commodity prices alone. In the second place, in so far as logical relations should exist, as between long and short term interest rates, the logical adjustment of the one series to the other so often requires more than a mere knowledge of the past and present. Logically, as we have shown, long term interest rates should be adjusted to future short term rates. But this is quite impossible not only because the future is not known but also because, in the stress of deflation, it could not be acted on if it were known.¹¹

Few economic series are like long and short term interest rates, which logically would depend on one another alone, unaffected by what happens to all other series. The reason in this case is, as we have

¹¹ This would not be strictly true in a hypothetical society where all was known. In such a society 'deflation' would not occur. However, this merely illustrates that the economic cycle is a phenomenon of a society in which all is not known. Of course, the hypothesis of a society where 'all is known' becomes a metaphysical concept hardly to be distinguished from the nineteenth century mechanistic philosophy which would suggest that if, at the birth of Christ, the exact position and motion of every atom in the universe were known to a sufficiently skillful mathematician, he could have stated that beer would come back to America in April 1933.

seen in Chapter II, that logically they are the same thing. The relation would be what the logicians term an 'essential' relation. Long term interest rates would be absolutely rigidly related to short term rates because they would be an average of a particular form of future short term rates. They would be related to short term rates in much the same manner as an index number of commodity prices is related to the prices of the individual commodities.

To the extent that adjustment requires a knowledge of the future, economic relations tend to depart from what they logically would be. 'Present' adjustments, such as those concerned with the making in a market of a price for a perishable consumers' good, may approach a rational norm similar to that presented by the more rigid and arithmetic of the members of the Austrian school, for example, Philip H. Wicksteed, but adjustments involving forecasts of the future cannot do so.

In our discussion of the relation of bond yields to short term interest rates and to commodity prices we drew attention to the inadequacy of adjustments requiring knowledge of the future. The relation of bond yields to the general level of profits and to changes in the monetary and physical volume of business—the 'other' series that we present and discuss in this volume—is of a similar type. To be at all adequate as an adjustment, the relation would necessitate a complete knowledge of all the relevant future. Indeed knowledge of the future is, in each of these relations, the fundamental requirement. In the case of business profits this is immediately apparent. After correction for the element of risk, *future* profits (if they could be adequately forecast) would be a factor to which bond yields would have to adjust themselves. Fluctuations in the monetary volume of business do not appear to be so directly related to bond yields unless we remember their usual close relation to profits. Periods of high volume (physical or monetary) of production are usually periods of high rates of profit. Enforced liquidation may cause a sudden spurt in the monetary volume of trade and even stimulate production, undertaken to convert inventories into more salable products, but spurts due to enforced liquidation seldom last long. In general, both the physical and monetary volume of business is large when an increased demand has brought about an increased output, then a rise in prices followed by a further increase in output. Usually the price rise remains or even continues

while the output is increasing. An increased physical volume without any increase in the monetary volume can occur only when prices have been falling. This would be most likely to occur in the very early stages of a revival. However, the increased physical volume could not be great or it would lead to an increased monetary volume. Absolute figures (not deviations from trends) of monetary volume would, of course, be more closely related to monetary profit levels than would absolute figures of physical volume.

The relations of the larger deviations from long term trends (so-called cycles) would, under a condition of complete and adequate adjustment (on the assumption of complete knowledge of the future), be of almost the same kind as if there were no trends, because, if one series were adjusted to future values of the other, this adjustment could be broken down into two components: one an adjustment to the future trend and the other an adjustment to the 'cycles', or better say, the major deviations from the trends. Now the adjustment to the future trend would tend to have the same sort of long term 'sweep' that all trends have. Because the trend of the independent variable is a trend—in other words, changes its level and direction only very slowly—the dependent variable will do likewise. On the other hand, of course, when the theoretical adjustment is such that the dependent variable is merely a first derived function of the independent variable—as it would be if call money were absolutely determined by the monetary *rate* of change in commodity prices—the curve tracing the course of the dependent variable would not have the clear-cut 'trend' characteristics of the independent variable. However, not only would we not expect—even under the hypothesis of complete knowledge of the future—call money to be related to commodity price movements in this manner, but even if it were, the movements of time money, and still more those of long term bond yields, would, so far as they were dependent on the trend of commodity prices, have themselves almost as much of the 'sweep' and 'trend' characteristics as would the commodity prices. If the duration of a bond were long enough, the 'trend' of the yield would, under the assumption of complete adjustment to the future trend of commodity prices, show an even more pronounced 'sweep' than the commodity price trend itself.

But, leaving these discussions of how things would occur if the future were known and if that knowledge were rationally used, we

must emphasize that all the relations among the various series tend to be of the same illogical, or at least non-logical, nature we have already found to exist in the actual relations between bond yields and short term interest rates and commodity prices. Moreover, as we have attempted to explain in Chapter I, the relations are not uniform, for they are always affected more or less by good or bad forecasting. They are a composite of the results of past and present facts, and forecasts of the future. Because the forecasts vary with respect to not only their goodness but also the importance of their effect as compared with past and present facts, the series show only a very moderate degree of uniformity in their relations from year to year and from decade to decade. In a period of prosperity the influence of forecasting (of further prosperity or even of a termination of prosperity) is more important as compared with the influence on past or present facts than in a period of depression or crisis. As we have already noted, when selling is 'forced' the element of forecast becomes quite negligible.

With the growth of knowledge the accuracy of forecasting will increase but this can bring about a pronounced decrease in the violence of economic disturbances only if it entails something more than mere 'speculative' forecasting. It must lead to a change in those present conditions that tend to produce untoward future results. In a period of over-rapid credit expansion it is not enough to foresee that when such expansion can go no further a collapse of prices will begin. It is not sufficient to sell securities and commodities or even sell them short in preparation for such a collapse. It is necessary to check the credit expansion. We must make the future and not merely foresee it. And that can be done only in the present. Mere knowledge is not sufficient. It can never be complete and it will always be human nature to gamble on whether if one buys at an inflated level he will be able to find a bigger fool than himself to buy from him at a still higher level. The primary reason for the variableness of the economic future to which man must adjust himself lies in man himself. Without knowing what the future effects of his present acts will be, and often apparently caring less, he proceeds to *make* a future to which he will find he cannot adjust himself.

It would, of course, be absurd for the *individual* speculator or entrepreneur to base his business operations naively and completely on an

attempted analysis of how the social present *should* be adjusted to the social future. If we have demonstrated anything in this book, it is that economic phenomena are, in fact, only accidentally so related. But it is strange indeed that economic theorists should so seldom have hinted at, let alone analyzed, the *social* import of the opposition of the logical and actual sequences. That present conditions, if they are not to contain the seeds of future disturbance, must be adjusted to future conditions would seem plain and obvious. But perhaps it is too plain. The very insolence of the obvious can easily prevent its being noticed. And, even if noticed, its significance can all too easily be missed.



TABLES

1	Identification Table of American Railroad Bonds	A5
2	Paper Prices of American Railroad Bonds, Monthly, January 1857-January 1879	A21
3	Yields of American Railroad Bonds, Monthly, January 1857-January 1936	A33
4	American Railroad Bond Yields, January Index Numbers	A108
5	American Railroad Bond Yields, Six Index Numbers of Best 5 and Worst 5 Bonds	A110
6	Index Numbers of the Yields of American Railroad Bonds Based on Sigma Equations	A113
7	American Railroad Bond Yields, Mathematical Functions and Equations; Januaries 1857-1936	A131
8	Same, Quarterly	A134
9	Month to Month Slopes of 'Sigma Lines' Fitted to the Logarithms of the Yields of American Railroad Bonds from January 1879 to January 1936	A139
10	Short Time Interest Rates, Bond Yields and Stock Prices	A141
11	An Adjusted Arithmetic Index Number of the Yields of American Railroad Bonds, Monthly, January 1857-January 1936	A162
12	New England Municipal Bond Yields, January Index Numbers	A172
13	New England Municipal Bond Yields, Arithmetic Average Quarterly Index Number, January 1857-January 1914	A174
14	Railroad Common Stock Price Relatives, January 1857-January 1936	A181
15	Railroad Common Stock Weights, January 1857-January 1936	A193
16	Four Index Numbers of the January Prices of American Railroad Common Stocks	A204
17	An Arithmetic Average Index Number of the Prices of American Railroad Common Stocks, Weighted According to the Number of Shares of Each Company Outstanding at the Beginning of Each Year, Monthly, January 1857-January 1936	A206

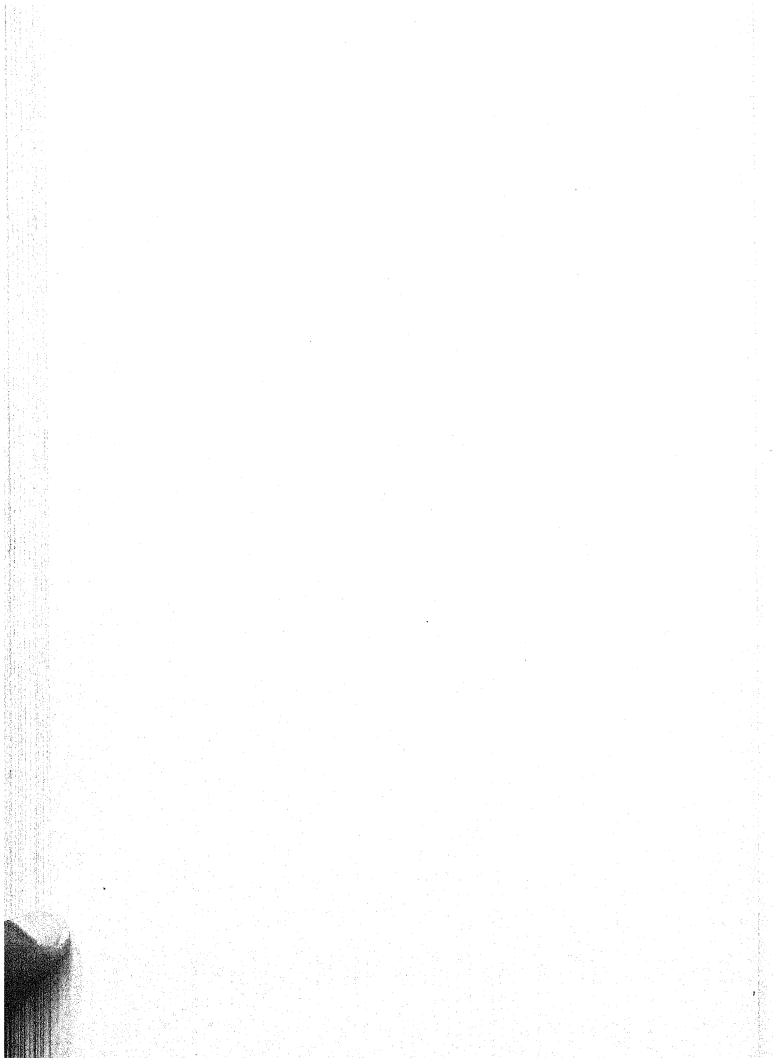
18	Price of Gold in Greenbacks, January 1862–December 1878	A215
19	An Unadjusted Arithmetic Average Index Number of the Yields in Gold of American Railroad Bonds, Monthly, January 1857–January 1879	A216
20	An Index Number of the Gold Prices of American Railroad Common Stocks, January 1862–December 1878	A219
21	Call Money Rates at the New York Stock Exchange, Monthly, January 1857–January 1936	A222
22	90-Day Time Money Rates in New York City, Monthly, January 1890–January 1936	A231
23	Commercial Paper Rates in New York City, Monthly, January 1857–January 1936	A237
24	Commercial Paper Rates in Boston, Monthly, 1831–1860 (Martin)	A246
25	Commercial Paper Rates in Boston, Monthly, 1831–1860 (Bigelow)	A248
26	Average Monthly Rates on 90-Day Prime Bankers' Acceptances, January 1918–December 1935	A251
27	Bank Clearings, Pig Iron Production and Wholesale Prices	A252
28	Daily Average Bank Clearings in New York City, Monthly, January 1857–January 1919; Daily Average Bank Debits in New York City, Monthly, January 1919–January 1936	A271
29	Daily Average Bank Clearings Outside New York City, Monthly, January 1875–January 1919; Daily Average Bank Debits for 140 Outside Cities, Monthly, January 1919–January 1936	A281
30	Deflated Bank Clearings Outside New York City, Monthly, January 1875–January 1919; Deflated Bank Debits for 140 Outside Cities, Monthly, January 1919–January 1936	A289
31	Daily Average Pig Iron Production in the United States, Monthly, January 1877–January 1936	A297
32	United States Bureau of Labor Statistics Index Number of Wholesale Prices of Commodities, Monthly, January 1890–January 1936	A304
33	Dr. Wesley C. Mitchell's Dates of High and Low Points in General Business in the United States	A308

CHARTS

1	American Railroad Bond Yields, Index Numbers for Each January, April, July, and October, 1857-1936	91
2	Four Index Numbers of the Yields of American Railroad Bonds, January 1857-January 1936	93
3	Four Index Numbers of the January Yields of American Railroad Bonds, Each January, 1857-1936	95
4	Four Index Numbers of the January Yields of American Railroad Bonds, the 4.50 Sigma and Three Index Numbers Based on Averages of the Five Bonds Having the Highest Yields Each January, 1857-1936	96
5	American Railroad Bond Yields, Scatter Diagrams of Three Identical Groups of 41 Bonds	102
6	American Railroad Bond Yields, Scatter Diagrams, January 1857-January 1936	104
7	New England Municipal Bond Yields and American Railroad Bond Yields, Index Numbers for Each January, April, July, and October, 1857-1914	118
8	The January 1903 and January 1904 Yields of Bonds and Preferred Stocks on the New York Stock Exchange	124
9	American Railroad and Public Utility Bond Yield Scatter Diagram	125
10	American Municipal and Railroad Bond Yields, January 1900-January 1936	126
11	Different 'Drifts' Shown by Index Numbers of Public Utility Bond Yields, Railroad Bond Yields, and Municipal Bond Yields	127
12	Frequency Distributions of Railroad Stock Price Relatives	140
13	Four Index Numbers of the Prices of American Railroad Stocks, January Each Year, 1857-1936	149
14	American Railroad Stock Prices and American Railroad Bond Yields, January 1857-January 1936	155

15	American Railroad Stock Prices and a Cumulated Product of the Slopes of the 'Sigma' Lines Fitted to the Yields of American Railroad Bonds	160
16	British and American Bond Yields and Commodity Prices, Annually	165
17	American Railroad Bond Yields and Commodity Prices, a Scatter Diagram	175
18	American Bond Yields and Commodity Prices, Monthly, January 1890-January 1936	178
19	British Consols and Commodity Prices, Monthly, January 1890-January 1936	181
20	American Railroad Bond Yields and Short Time Interest Rates in New York City, January 1857-January 1936	217
21	Cyclical Movements of Interest Rates and Other Economic Series	218
22	Bond Yields and the Volume of Business, 1857-1935—Long Time Trends	223
23	Bond Yields and the Monetary and Physical Volume of Business, January 1875-January 1936	224
24	Bond Yields and the Physical Volume of Business, January 1875-January 1936	225
25	American Railroad Bonds, Gold and Currency Yields, January 1857-January 1879	226
26	Gold Yields of American Railroad Paper Bonds and the Price of Gold in Greenbacks, January 1862-January 1879	227
27	Gold and Paper Prices of American Railroad Stocks, January 1857-January 1879	228
28	Interest Rates and Security Prices in the United States, January 1857-January 1879	229
29	Long Time Movements of the Various Series as Shown by Cycle-Eliminating Trend Lines	230
30	American Railroad Bonds Used in Constructing Index Numbers and the Periods During Which Quotations Were Used	A17
31	New England States, Counties and Cities Whose Bonds Were Used in Constructing Index Numbers and the Periods During Which Quotations Were Used	A171
32	American Railroads: the Periods During Which Their Common Stock Prices Were Used in Constructing Index Numbers	A178

APPENDICES



APPENDIX A

THE FIGURES for the cyclical and cycle-eliminating curves and other mathematical material presented in Appendix A are, in most instances, given to at least one more decimal place than are the original data on which they are based.

In some of the mathematical material (such as the sigma equations of Tables 7 and 8 and the sigma 'slopes' of Table 9) extra decimals are given because cumulative multiplication was one of the purposes for which the material was calculated and, with such cumulation, if the number of decimals be too small, accuracy decreases rapidly. But the primary defense of such a procedure as calculating and printing one more decimal in a graduation (and in the deviations of the data from that graduation) than occur in the original data is that some readers may be interested in the graduation from a purely mathematical standpoint. While the economist might ask (particularly as to deviations) why more decimals were included than are warranted by the accuracy of the data and the adequacy of the graduation formula, the student of graduation *per se* might as reasonably inquire why the extra decimal was dropped. He might well be primarily interested in studying the significance and mathematical peculiarities of the results obtained by using the formula; and, for most phases of such a study, the complete accuracy and even representativeness of the data would be assumed—if not considered irrelevant. For most of *his* analytic problems, the data are mere mathematical premises and not economic observations.

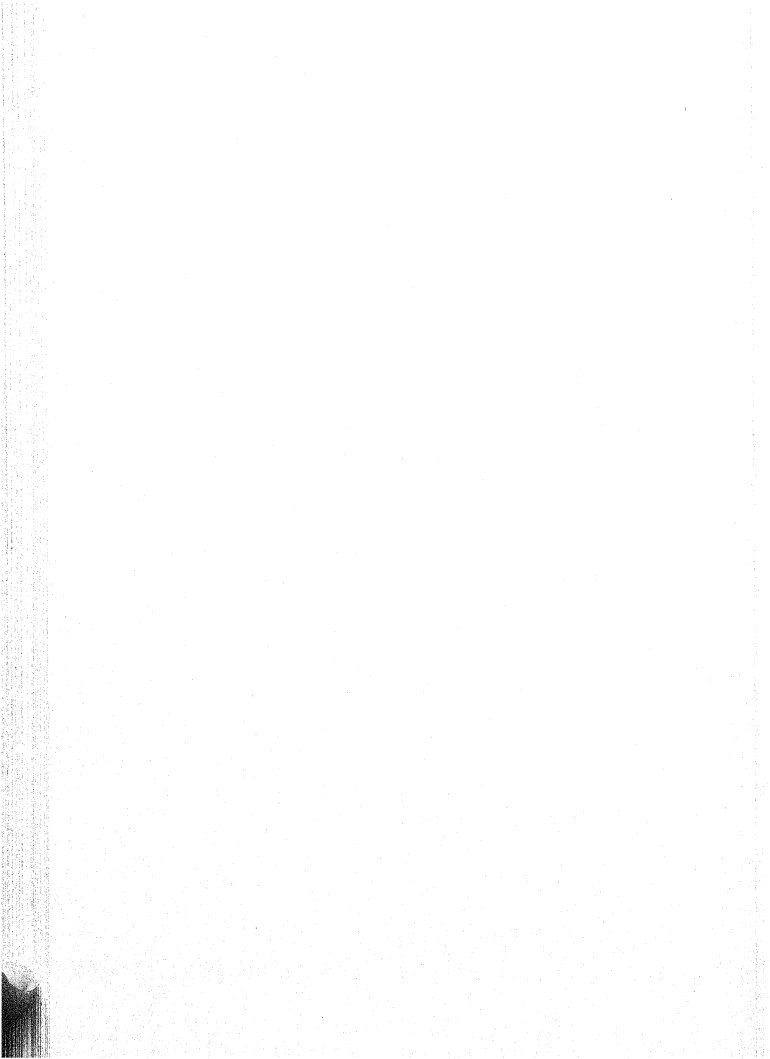


TABLE 1

IDENTIFICATION TABLE OF AMERICAN RAILROAD BONDS

This is a table to be used with Tables 2 and 3. Table 3 contains the identification numbers of Table 1, and also an abbreviated description. In Table 2 identification numbers only are given.

Table 1 consists of the exact name of each bond and information concerning security, medium of payment (gold or currency), date of issue, date of maturity, amount and dates of interest payments, whether bond is registered or coupon, and convertible or callable features.

(All bonds are coupon bonds unless designated registered)

1. Hudson River Railroad 1st mortgage 7s currency.
Dated Feb 1, 1849; due Feb 1, 1869.
Interest paid Feb 1 & Aug 1. Registered.
2. Chicago and Rock Island Railroad 1st mortgage 7s currency
Dated July 10, 1850; due July 10, 1870.
Interest paid Jan 10 & July 10.
Convertible into common stock of Chicago and Rock Island Railroad at par on any interest date on or before the 10th of July, 1858.
3. Lehigh Coal and Navigation Company general mortgage and deed of trust 6s currency.
Dated Mar 7, 1842; due Mar 1, 1870.
Interest paid quarterly Jan 1, Apr 1, July 1 & Oct 1.
4. Philadelphia and Reading Railroad 2nd mortgage 6s currency
Dated Apr 1, 1849; due Apr 1, 1870.
Interest paid Apr 1 & Oct 1.
5. New York and Harlem Railroad 1st mortgage 7s currency.
Dated May 1, 1853; due May 1, 1873.
Interest paid May 1 & Nov 1.
6. Lehigh Valley Railroad 1st mortgage 6s currency.
Dated May 1, 1853; due May 1, 1873.
Interest paid May 1 & Nov 1.
7. Morris Canal and Banking Company 1st mortgage 6s currency.
Dated Oct 1, 1856; due April 1, 1876.
Interest paid Apr 1 & Oct 1.
8. Eastern Railroad (Massachusetts) 6s currency.
Dated Aug 1, 1854; due Aug 1, 1874.
Interest paid Feb 1 & Aug 1.
9. Pennsylvania Railroad 2nd mortgage dollar bonds 6s currency.
Dated June 1, 1854; due Mar 31, 1875.
Interest paid Apr 1 & Oct 1.
10. Pennsylvania Railroad 1st mortgage dollar bonds 6s currency.
Dated Oct 14, 1852; due Dec 31, 1880.
Interest paid Jan 1 & July 1.

11. Camden and Amboy Railroad 6s currency.
Dated Jan 1, 1854; due Jan 1, 1889.
Interest paid June 1 & Dec 1.
12. Camden and Amboy Railroad 6s currency.
Dated July 1, 1833; due Feb 1, 1883.
Interest paid Feb 1 & Aug 1.
13. New York Central Railroad debt certificates or "premium bonds" 6s currency.
Dated Aug 1, 1853; due May 1, 1883.
Interest paid May 1 & Nov 1.
Note:—The term "premium bonds" does not refer to the principal of the bond. These bonds promised to pay \$1,000 on May 1, 1883.
14. New York Central Railroad "bonds for debts assumed" 7s currency.
Dated Aug 1, 1856; due Aug 1, 1876.
Interest paid Feb 1 & Aug 1.
15. Chicago, Burlington and Quincy Railroad 1st mortgage 8s currency.
Dated Jan 1, 1858; due Jan 1, 1883.
Interest paid Jan 1 & July 1.
16. Hudson River Railroad 2nd mortgage 7s currency.
Dated Dec 16, 1850; extended Dec 16, 1860; due June 16, 1885.
Interest paid June 16 & Dec 16.
17. Chicago and Northwestern Railway "preferred sinking fund" (1st mortgage, Chicago to Oshkosh) 7s currency.
Dated July 1, 1859; due Aug 1, 1885.
Interest paid Feb 1 & Aug 1.
18. Philadelphia and Erie Railroad 1st mortgage 6s currency.
Dated Mar 31, 1861; due Mar 31, 1881.
Interest paid Apr 1 & Oct 1.
19. Galena and Chicago Union Railroad 1st mortgage 7s currency.
Dated Feb 1, 1852; extended Feb 1, 1862; due Feb 1, 1882.
Interest paid Feb 1 & Aug 1
Callable at 105 on Feb 1, 1877.
20. Michigan Southern and Northern Indiana Railroad 1st mortgage 7s currency.
Dated May 1, 1855; due May 1, 1885.
Interest paid May 1 & Nov 1.
21. Cleveland and Toledo Railroad 1st mortgage 7s currency.
Dated July 1, 1855; due July 1, 1885.
Interest paid Jan 1 & July 1.
22. Connecticut and Passumpsic Rivers Railroad 1st mortgage 6s currency.
Dated Dec 1, 1856; due Dec 1, 1876.
Interest paid June 1 & Dec 1.
23. Buffalo, New York and Erie Railroad 1st mortgage 7s currency.
Dated Oct 29, 1857; due Dec 1, 1877.
Interest paid June 1 & Dec 1.

24. Chicago and Alton Railroad 1st mortgage 7s currency.
Dated Dec 1, 1862; due Jan 1, 1893.
Interest paid Jan 1 & July 1.
25. Pittsburgh, Fort Wayne and Chicago Railway 1st mortgage 7s Series A currency.
Dated Mar 1, 1862; due July 1, 1912.
Interest paid Jan 1 & July 1.
26. Camden and Amboy Railroad mortgage 6s currency.
Dated Nov 1, 1862; due Nov 1, 1889.
Interest paid May 1 & Nov 1.
27. Toledo and Wabash Railroad 1st mortgage 7s currency.
Dated Aug 1, 1853; extended Aug 1, 1865; due Aug 1, 1890.
Interest paid Feb 1 & Aug 1.
28. St. Louis, Alton and Terre Haute Railroad 1st mortgage 7s Series A currency.
Dated June 30, 1862; due July 1, 1894.
Interest paid Jan 1 & July 1.
29. New York Central Railroad renewal bonds 6s currency.
Dated June 15, 1854—7s; extended June 15, 1864—6s; due Dec 15, 1887.
Interest paid June 15 & Dec 15.
30. Morris and Essex Railroad 1st mortgage 7s currency.
Dated July 1, 1864; due May 1, 1914.
Interest paid May 1 & Nov 1.
31. New York and Erie Railroad 1st mortgage 7s currency.
Dated July 1, 1847; extended May 1, 1867; due May 1, 1897.
Interest paid May 1 & Nov 1.
32. Milwaukee and St. Paul Railway (Prairie du Chien Division) 1st mortgage 8s currency.
Dated Feb 1, 1868; due Feb 1, 1898.
Interest paid Feb 1 & Aug 1.
33. Lehigh Valley Railroad 1st mortgage 6s currency.
Dated June 1, 1868; due June 1, 1898.
Interest paid June 1 & Dec 1.
34. Central Railroad of New Jersey "new bonds" later 1st mortgage 7s currency.
Dated 1869; due Feb 1, 1890.
Interest paid Feb 1 & Aug 1.
35. Lehigh Coal and Navigation Company "railroad loan" 6s currency.
Dated 1867; due Feb 1, 1897.
Interest paid quarterly Feb 1, May 1, Aug 1 & Nov 1.
36. Chicago and Milwaukee Railroad 1st mortgage 7s currency.
Dated 1863; due July 1, 1898.
Interest paid Jan 1 & July 1.
37. Lake Shore Railway "dividend bonds" 7s currency.
Dated Apr 1, 1869; due Apr 1, 1899.
Interest paid Apr 1 & Oct 1.
38. Cleveland, Columbus, Cincinnati and Indianapolis Railway

- 1st mortgage 7s currency.
Dated 1869; due May 1, 1899
Interest paid May 1 & Nov 1.
39. Lehigh Valley Railroad 2nd mortgage 7s currency.
Dated July 1, 1870; due Sept 1, 1910.
Interest paid Mar 1 & Sept 1. Registered.
40. Chicago and Northwestern Railway consolidated 7s currency.
Dated Jan 16, 1865; due Feb 1, 1915.
Interest paid quarterly, Feb 1, May 1, Aug 1 & Nov 1.
41. Lake Shore and Michigan Southern Railway consolidated 1st mortgage 7s currency.
Dated July 1, 1870; due July 1, 1900.
Interest paid Jan 1 & July 1.
42. Pennsylvania Railroad general mortgage 6s currency.
Dated July 1, 1867; due July 1, 1910.
Interest paid Jan 1 & July 1
43. New York and Harlem Railroad consolidated (later 1st) mortgage 7s currency.
Dated May 1, 1872; due May 1, 1900.
Interest paid May 1 & Nov 1.
44. New York Central and Hudson River Railroad 1st mortgage 7s currency.
Dated Jan 15, 1873; due Jan 1, 1903.
Interest paid Jan 1 & July 1.
45. Chicago, Burlington and Quincy Railroad consolidated mortgage 7s currency.
Dated July 1, 1873; due July 1, 1903.
Interest paid Jan 1 & July 1.
46. Cleveland and Pittsburgh Railroad consolidated mortgage 7s currency.
Dated 1867; due Nov 1, 1900.
Interest paid May 1 & Nov 1.
47. Michigan Central Railroad consolidated mortgage 7s currency.
Dated May 1, 1872; due May 1, 1902.
Interest paid May 1 & Nov 1.
48. Central Pacific Railroad 1st mortgage 6s Series A gold.
Dated July 1, 1865; due July 1, 1895.
Interest paid Jan 1 & July 1.
49. Chicago, Rock Island and Pacific Railroad 1st mortgage 6s currency.
Dated May 1, 1877; due July 1, 1917.
Interest paid Jan 1 & July 1.
50. Chicago and Northwestern Railway consolidated mortgage 7s gold.
Dated Nov 1, 1872; due Dec 1, 1902.
Interest paid June 1 & Dec 1.
51. Chicago, St Paul and Minneapolis Railway 1st mortgage 6s gold.
Dated May 9, 1878; due May 1, 1918.
Interest paid May 1 & Nov 1.
52. St. Paul, Minneapolis & Manitoba 2nd mortgage 6s gold.

Dated Oct 1, 1879; due Oct 1, 1909.

Interest paid Apr 1 & Oct 1.

53. Nashville, Chattanooga and St. Louis Railway 1st mortgage 7s currency.

Dated July 1, 1873; due July 1, 1913.

Interest paid Jan 1 & July 1.

54. St Paul and Sioux City Railroad 1st mortgage 6s gold.

Dated July 1, 1879; due Apr 1, 1919.

Interest paid Apr 1 & Oct 1.

55. Chicago, Milwaukee and St Paul Railway (Southern Minnesota Division) 1st mortgage 6s currency.

Dated Jan 1, 1880; due Jan 1, 1910.

Interest paid Jan 1 & July 1.

56. Canada Southern Railway 1st mortgage 5s Canadian currency.

Dated Oct 31, 1877; due Jan 1, 1908.

Interest paid Jan 1 & July 1.

57. Chicago, St Paul, Minneapolis and Omaha Railway consolidated 6s currency.

Dated June 1, 1880; due June 1, 1930.

Interest paid June 1 & Dec 1.

58. St. Paul, Minneapolis and Manitoba Railway (Dakota Extension) 1st mortgage 6s gold.

Dated Nov 1, 1880; due Nov 1, 1910.

Interest paid May 1 & Nov 1.

59. Philadelphia and Erie Railroad general mortgage 5s gold.

Dated July 1, 1869; due July 1, 1920

Interest paid Apr 1 & Oct 1. Registered.

60. Chicago, Milwaukee and St Paul Railway (Chicago and Pacific Western Division) 1st mortgage 5s gold.

Dated Jan 1, 1881; due Jan 1, 1921.

Interest paid Jan 1 & July 1.

61. Chicago, Milwaukee & St Paul Railway (Wisconsin and Minnesota Division) 1st mortgage 5s gold

Dated July 1, 1881; due July 1, 1921.

Interest paid Jan 1 & July 1.

62. Chicago, St Louis and New Orleans Railroad consolidated mortgage 5s gold.

Dated Mar 15, 1881; due June 15, 1951.

Interest paid June 15 & Dec 15.

63. Pennsylvania Company 1st mortgage 4½s gold.

Dated Apr 1, 1881; due July 1, 1921.

Interest paid Jan 1 & July 1.

64. New York, Lackawanna and Western Railway 1st mortgage 6s gold.

Dated Dec 1, 1880; due Jan 1, 1921.

Interest paid Jan 1 & July 1.

65. Hannibal and St Joseph Railroad consolidated mortgage 6s currency.

Dated Apr 30, 1881; due Mar 1, 1911.

Interest paid Mar 1 & Sept 1.

66. New York Central and Hudson River Railroad debenture 5s currency.
Dated Sept 1, 1884; due Sept 1, 1904.
Interest paid Mar 1 & Sept 1.
67. Baltimore and Ohio Railroad 5s gold.
Dated Jan 31, 1885; due Feb 1, 1925.
Interest paid Feb 1 & Aug 1.
68. Chicago, Milwaukee and St Paul Railway, terminal mortgage 5s gold.
Dated July 1, 1884; due July 1, 1914.
Interest paid Jan 1 & July 1.
69. Chicago and Northwestern Railway debenture 5s currency.
Dated July 1, 1884; due Nov 1, 1909.
Interest paid May 1 & Nov 1.
70. West Shore Railroad 1st mortgage 4s currency.
Dated Dec 5, 1885; due Jan 1, 2361.
Interest paid Jan 1 & July 1.
71. Chicago and Northwestern Railway debenture 5s currency.
Dated May 1, 1883; due May 1, 1933.
Interest paid May 1 & Nov 1.
72. Chicago and Northwestern Railway extension 4s currency.
Dated Apr 15, 1886; due Aug 15, 1926.
Interest paid Feb 15 & Aug 15.
73. St Paul, Minneapolis and Manitoba Railway consolidated mortgage $4\frac{1}{2}$ s (originally 6s) gold.
Dated May 1, 1883; due July 1, 1933.
Interest paid Jan 1 & July 1.
74. Cincinnati, Indianapolis, St Louis and Chicago Railway general 1st mortgage 4s gold
Dated Aug 2, 1886; due Aug 1, 1936.
Interest paid quarterly Feb 1, May 1, Aug 1 & Nov 1.
75. Pacific Railroad (of Missouri) 1st mortgage extended 4s gold.
Dated Aug 1, 1868; due Aug 1, 1888 (6% coupon); extended Feb 1, 1887; due Aug 1, 1938 (4% coupon).
Interest paid Feb 1 & Aug 1.
76. Illinois Central Railroad collateral trust 4s gold.
Dated Mar 31, 1888; due Apr 1, 1952.
Interest paid Apr 1 & Oct 1.
77. Lake Erie and Western Railroad 1st mortgage 5s gold.
Dated Feb 21, 1887; due Jan 1, 1937.
Interest paid Jan 1 & July 1.
78. Wabash Railroad 1st mortgage 5s gold.
Dated May 1, 1889; due May 1, 1939.
Interest paid May 1 & Nov 1.
79. Chesapeake and Ohio Railway (Eastern Extension) 1st mortgage 6s gold.
Dated Jan 1, 1881; due Jan, 1911.
Interest paid Apr 1 & Oct 1.
80. Rome, Watertown and Ogdensburg Railroad consolidated mortgage 5s gold.

- Dated July 1, 1874; extended July 1, 1882 (gold); due July 1, 1922.
Interest paid Apr 1 & Oct 1 and a $1\frac{1}{4}\%$ coupon on July 1, 1922.
81. New York, Chicago and St Louis Railroad 1st mortgage 4s gold.
Dated Oct 1, 1887; due Oct 1, 1937.
Interest paid Apr 1 & Oct 1.
82. Chesapeake and Ohio Railway 1st consolidated mortgage 5s gold.
Dated Jan 1, 1889; due May 1, 1939.
Interest paid May 1 & Nov 1.
83. Illinois Central Railroad collateral trust (Louisville, New Orleans and Texas Railway collateral) 4s gold.
Dated Sept 1, 1892; due Nov 1, 1953.
Interest paid May 1 & Nov 1.
84. Chesapeake and Ohio Railway (Richmond and Alleghany Railway Division) 1st consolidated mortgage 4s gold.
Dated Jan 20, 1890; due Jan 1, 1989.
Interest paid Jan 1 & July 1.
85. Cleveland, Cincinnati, Chicago and St Louis Railway (St Louis Division) 1st collateral trust mortgage 4s gold.
Dated Nov 1, 1890; due Nov 1, 1990.
Interest paid May 1 & Nov 1.
86. East Tennessee, Virginia and Georgia Railway consolidated 1st mortgage 5s gold.
Dated July 5, 1886; due Nov 1, 1956.
Interest paid May 1 & Nov 1.
87. Chicago, Milwaukee and St Paul Railway general mortgage 4s Series A gold.
Dated May 1, 1889; due May 1, 1989.
Interest paid Jan 1 & July 1.
88. Lake Shore and Michigan Southern Railway 1st mortgage $3\frac{1}{2}s$ gold.
Dated June 1, 1897; due June 1, 1997.
Interest paid June 1 & Dec 1.
89. St Paul, Minneapolis and Manitoba Railway (Montana Extension) 1st mortgage 4s gold.
Dated June 1, 1887; due June 1, 1937.
Interest paid June 1 & Dec 1.
90. Baltimore and Ohio Railroad 1st mortgage 4s gold.
Dated July 1, 1898; due July 1, 1948.
Interest paid Apr 1 & Oct 1.
Callable at 105 after June 30th 1923 upon three months' notice.
91. Union Pacific Railroad 1st mortgage railroad and land grant 4s gold.
Dated July 1, 1897; due July 1, 1947.
Interest paid Jan 1 & July 1.
92. Chicago and Northwestern Railway general mortgage $3\frac{1}{2}s$ gold.
Dated Nov 1, 1897; due Nov 1, 1987.
Interest paid May 1 & Nov 1.
93. Chicago, Rock Island and Pacific Railway general mortgage 4s gold.

- Dated Jan 1, 1898; due Jan 1, 1898.
Interest paid Jan 1 & July 1.
94. Atchison, Topeka and Santa Fe Railway general mortgage 4s gold.
Dated Dec 12, 1895; due Oct 1, 1895.
Interest paid Apr 1 & Oct 1.
95. New York Central and Hudson River Railroad refunding mortgage
3½s gold.
Dated June 1, 1897; due July 1, 1897.
Interest paid Jan 1 & July 1.
96. Scioto Valley and New England Railroad 1st mortgage 4s gold.
Dated Nov 1, 1889; due Nov 1, 1889.
Interest paid May 1 & Nov 1.
97. Lehigh Valley Railway (of New York) 1st mortgage 4½s gold.
Dated June 23, 1890; due July 1, 1940.
Interest paid Jan 1 & July 1.
98. Louisville and Nashville Railroad unified mortgage 4s gold.
Dated June 2, 1890; due July 1, 1940.
Interest paid Jan 1 & July 1.
99. Oregon Railroad and Navigation Company consolidated mortgage
4s gold.
Dated Aug 17, 1896; due June 1, 1946.
Interest paid June 1 & Dec 1.
100. Chicago, Burlington and Quincy Railroad (Illinois Division) 1st
mortgage 3½s currency.
Dated July 1, 1899; due July 1, 1949.
Interest paid Jan 1 & July 1.
Callable as a whole at 105 and interest on any interest date
after July 1, 1929 on six months' notice.
101. Central Pacific Railway 1st refunding mortgage 4s gold.
Dated Aug 1, 1899; due Aug 1, 1949.
Interest paid Feb 1 & Aug 1.
102. Northern Pacific Railway prior lien railroad and land grant
mortgage 4s gold.
Dated Nov 10, 1896; due Jan 1, 1897.
Interest paid quarterly Jan 1, Apr 1, July 1 & Oct 1.
103. Norfolk and Western Railway 1st consolidated mortgage 4s gold.
Dated Oct 22, 1896; due Oct 1, 1896.
Interest paid Apr 1 & Oct 1.
104. Central Railroad Company of New Jersey general mortgage 5s gold.
Dated July 1, 1887; due July 1, 1887.
Interest paid Jan 1 & July 1.
105. Hocking Valley Railway 1st consolidated mortgage 4½s gold.
Dated July 1, 1899; due July 1, 1899.
Interest paid Jan 1 & July 1.
106. Norfolk and Western Railway divisional first lien and general
mortgage 4s gold.
Dated July 1, 1904; due July 1, 1944.
Interest paid Jan 1 & July 1.
Callable at 105 and interest on any interest date after January
1, 1929 upon three months' notice.

107. Oregon Short Line Railroad consolidated 1st mortgage 5s gold.
Dated Mar 1, 1897; due July 1, 1946.
Interest paid Jan 1 & July 1.
108. Southern Pacific Railroad (California) first refunding mortgage 4s gold.
Dated Jan 3, 1905; due Jan 1, 1955.
Interest paid Jan 1 & July 1.
Callable at 105 and interest on Jan 1, 1910 or on any interest date thereafter at not less than three months' notice.
109. Atchison, Topeka and Santa Fe Railway adjustment mortgage 4s gold, stamped.
Dated Dec 12, 1895; due July 1, 1995.
Interest paid May 1 & Nov 1.
110. Northern Pacific Railway general lien 3s gold.
Dated Nov 10, 1896; due Jan 1, 2047.
Interest paid quarterly Feb 1, May 1, Aug 1 & Nov 1.
111. Atlantic Coast Line Railroad 1st consolidated mortgage 4s gold.
Dated July 1, 1902; due July 1, 1952.
Interest paid Mar 1 & Sept 1.
112. Delaware and Hudson Company first and refunding mortgage 4s gold.
Dated May 1, 1908; due May 1, 1943.
Interest paid May 1 & Nov 1.
Callable as a whole at 107½ and interest on May 1, 1918 or on any interest date thereafter upon thirteen weeks' notice.
113. Central of Georgia Railway consolidated mortgage 5s gold.
Dated Nov 1, 1895; due Nov 1, 1945.
Interest paid May 1 & Nov 1.
114. Pennsylvania Railroad consolidated mortgage 4s gold.
Dated May 1, 1908; due May 1, 1948.
Interest paid May 1 & Nov 1.
115. Kansas City Southern Railway 1st mortgage 3s gold.
Dated Apr 2, 1900; due Apr 1, 1950.
Interest paid Apr 1 & Oct 1.
116. Louisville and Nashville Railroad (Atlanta, Knoxville and Cincinnati Division) mortgage 4s gold.
Dated Apr 1, 1905; due May 1, 1955.
Interest paid May 1 & Nov 1.
117. Illinois Central Railroad refunding mortgage 4s gold.
Dated Nov 1, 1908; due Nov 1, 1955.
Interest paid May 1 & Nov 1.
Callable as a whole at 107½ and interest on Nov 1, 1918 or on any interest date thereafter upon not less than thirteen weeks' notice.
118. Chicago, Burlington and Quincy Railroad general mortgage 4s currency.
Dated Mar 2, 1908; due Mar 1, 1958.
Interest paid Mar 1 & Sept 1.
119. Southern Railway 1st consolidated mortgage 5s gold.

- Dated Oct 2, 1894; due July 1, 1994.
Interest paid Jan 1 & July 1.
120. Union Pacific Railroad 1st lien and refunding mortgage 4s gold.
Dated June 1, 1908; due June 1, 2008.
Interest paid Mar 1 & Sept 1.
Callable as a whole at 107½ and interest on Sept 1, 1918 or on any interest date thereafter upon three months' notice.
121. Atlantic Coast Line Railroad collateral trust (Louisville and Nashville Railroad collateral) 4s gold.
Dated Nov 1, 1902; due Oct 1, 1952.
Interest paid May 1 & Nov 1.
Callable on any interest date in amounts of not less than \$100,000 at 105 and interest.
122. Norfolk and Western Railway Pocahontas Coal and Coke joint mortgage 4s gold.
Dated Dec 2, 1901; due Dec 1, 1941.
Interest paid June 1 & Dec 1.
Callable at 105 and interest after Apr 1, 1906 from charges against coal mined.
123. Great Northern Railway 1st and refunding mortgage 4¼s Series A gold.
Dated May 1, 1911; due July 1, 1961.
Interest paid Jan 1 & July 1.
Callable as a whole at 105 and interest on or after Jan 1, 1941 upon ninety days' notice.
124. Canada Southern Railway 1st and refunding consolidated mortgage 5s Series A gold.
Dated Oct 1, 1912; due Oct 1, 1962.
Interest paid Apr 1 & Oct 1.
125. Morris and Essex Railroad 1st refunding mortgage 3½s gold.
Dated Dec 1, 1900; due Dec 1, 2000.
Interest paid June 1 & Dec 1.
126. Pennsylvania Railroad consolidated mortgage 4½s gold.
Dated Feb 1, 1915; due Aug 1, 1960.
Interest paid Feb 1 & Aug 1.
127. Canadian Northern Railway sinking fund debenture 6½s gold.
Dated July 1, 1921; due July 1, 1946.
Interest paid Jan 1 & July 1.
128. Great Northern Railway general mortgage 5½s Series B gold.
Dated Jan 1, 1922; due Jan 1, 1952.
Interest paid Jan 1 & July 1.
129. Atlantic Coast Line Railroad general unified 4½s Series A gold.
Dated June 1, 1914; due June 1, 1964.
Interest paid June 1 & Dec 1.
130. Pennsylvania Railroad general mortgage 4½s Series A gold.
Dated June 1, 1915; due June 1, 1965.
Interest paid June 1 & Dec 1.
131. Pennsylvania Railroad general mortgage 5s Series B gold.
Dated Dec 1, 1918; due Dec 1, 1968.
Interest paid June 1 & Dec 1.

132. Great Northern Railway general mortgage 5s Series C gold.
Dated Jan 1, 1923; due Jan 1, 1973.
Interest paid Jan 1 & July 1.
133. St Louis Southwestern Railway 1st mortgage bond certificates
(issued by the Central Trust Company) 4s gold.
Dated Nov 1, 1890; due Nov 1, 1989.
Interest paid May 1 & Nov 1.
134. Missouri, Kansas & Texas Railway 1st mortgage 4s gold.
Dated June 1, 1890; due June 1, 1990.
Interest paid June 1 & Dec 1.
135. Chesapeake and Ohio Railway general mortgage 4½s gold.
Dated Feb 23, 1892; due Mar 1, 1992.
Interest paid Mar 1 & Sept 1.
136. Cleveland, Cincinnati, Chicago and St Louis Railway general mortgage 4s Series A gold.
Dated May 15, 1893; due June 1, 1993.
Interest paid June 1 & Dec 1.
137. New York Central Railroad consolidation mortgage 4s Series A gold.
Dated Aug 1, 1913; due Feb 1, 1998.
Interest paid Feb 1 & Aug 1.
138. Texas and Pacific Railway 1st mortgage 5s gold.
Dated Feb 1, 1888; due June 1, 2000.
Interest paid June 1 & Dec 1.
139. Lehigh Valley Railroad (Pennsylvania) general consolidated mortgage 4s gold.
Dated Sept 30, 1903; due May 1, 2003.
Interest paid May 1 & Nov 1.
140. Canadian Pacific Railway 4% irredeemable debenture stock (a bond without maturity).
Issue authorized by an act of Parliament of the Dominion of Canada, passed in 1889, and subsequent acts. Issue of stock may be made from time to time.
Interest paid Jan 1 & July 1.
141. Southern Railway development and general mortgage 4s Series A gold.
Dated Apr 18, 1906; due Apr 1, 1956.
Interest paid Apr 1 & Oct 1.
142. Chicago and Western Indiana Railroad Company consolidated mortgage 4s gold.
Dated July 1, 1902; due July 1, 1952.
Interest paid Jan 1 & July 1.
143. Pittsburgh, Cincinnati, Chicago & St Louis Railroad general mortgage 5s Series B gold.
Dated Apr 1, 1925; due Apr 15, 1975.
Interest paid Apr 1 & Oct 1.
144. Great Northern Railway general mortgage 4½s Series D gold.
Dated July 1, 1926; due July 1, 1976.
Interest paid Jan 1 & July 1.

145. Chicago, Milwaukee and St Paul Railway general (now 1st) mortgage 4s Series A gold.
Dated May 1, 1889; due May 1, 1989.
Interest paid Jan 1 & July 1.
Remain undisturbed under plan of reorganization.
146. Erie Railroad Company 1st consolidated prior lien 4s gold.
Dated Dec 10, 1895; due Jan 1, 1996.
Interest paid Jan 1 & July 1.
147. Pennsylvania Railroad general mortgage $4\frac{1}{4}$ s Series D gold.
Dated Apr 1, 1931; due Apr 1, 1981.
Interest paid Apr 1 & Oct 1.
148. Chicago and Erie Railroad 1st 5s gold.
Dated Aug 21, 1890; due May 1, 1982.
Interest paid May 1 & Nov 1.
149. Chesapeake and Ohio Railway (Richmond and Alleghany Division) 1st 4s gold
Dated Jan 20, 1890; due Jan 1, 1989.
Interest paid Jan 1 & July 1.
150. Cleveland, Cincinnati, Chicago and St Louis Railway (St Louis Division) 1st collateral 4s gold
Dated Nov 1, 1890; due Nov 1, 1990.
Interest paid May 1 & Nov 1.

CHART 30

AMERICAN RAILROAD BONDS USED IN CONSTRUCTING INDEX NUMBERS
AND THE PERIODS DURING WHICH QUOTATIONS WERE USED

NAME OF RAILROAD BOND	DATE OF ISSUE	DATE OF MATURITY
1. HOBBS RIVER RR 1st M 7s	1849	Feb 1, 1869
2. CHICAGO & ROCK ISL RR 1st M 7s	1850	Jun 10, 1870
3. LEHIGH COAL & NAV CO GEN M 6s	1842	Mar 1, 1870
4. PHILA & READING RR 2nd M 6s	1849	Apr 1, 1870
5. NEW YORK & HARLEM RR 1st M 7s	1853	May 1, 1873
6. LEHIGH VALLEY RR 1st M 6s	1853	May 1, 1873
7. MORRIS CANAL & D CO 1st M 6s	1856	Apr 1, 1876
8. EASTERN RR (EAGS) 6s	1854	Aug 1, 1874
9. PENNSYLVANIA RR 2nd M 6s	1852	Mar 31, 1875
10. PENNSYLVANIA RR 1st M 6s	1852	Dec 31, 1880
11. CHICAGO & NORTHWESTERN RR 1st M 6s	1853	Jan 1, 1883
12. CINCINNATI & ANDY 6s	1853	May 1, 1883
13. N Y C RR DEBT CERTIFICATES 5s	1856	Aug 1, 1876
14. N Y C RR FOR DEBTS ASSUMED 7s	1859	Jan 1, 1883
15. CHIC BURL & QUINCY 1st M 6s	1850	Jun 16, 1885
16. HOOS R RR 2d M 7s 1860 EXT 1895	1859	Aug 1, 1885
17. CHIC & NON WEST RY 1st M 6s	1861	Mar 31, 1881
18. PHILADELPHIA & ERIE 1st M 6s	1852	Feb 1, 1882
19. GALDOR U I M 7s 1882 EXT 1892	1855	May 1, 1885
20. MICH SO & NON HOIAMA 1st M 7s	1855	Jul 1, 1885
21. CLEVELAND & TOLEDO 1st M 7s	1855	Jul 1, 1885
22. CLEVELAND & TOLEDO 2nd M 6s	1857	Dec 1, 1877
23. BUFFALO N Y & ERIE 1st M 7s	1852	Jan 1, 1883
24. CHICAGO & ALTON 1st M 7s	1852	Jul 1, 1912
25. PITTS FT WAYNE & CHIC 1st M 7s	1852	Nov 1, 1859
26. CINCINNATI & ANDY M 6s	1853	Aug 1, 1890
27. TOLLEMAN 1st M 7s 1855 EXT 1890	1852	Jul 1, 1894
28. ST L ALTON & T H RR 1st M 7s	1854	Dec 15, 1887
29. N Y CENTRAL RENEWAL BONDS 6s	1864	May 1, 1914
30. MORRIS & ESSEX 1st M 8s 7s	1867	May 1, 1897
31. NYEERIE 1st M 7s 1897 EXT 1897	1868	Feb 1, 1899
32. M & S T P (P O O CHIV) 1st M 6s	1868	Jun 1, 1899
33. LEHIGH VALLEY RR 1st M 6s	1868	Feb 1, 1899
34. CENTRAL RR OF NEW JERSEY 7s	1867	Feb 1, 1897
35. LEHIGH COAL & NAV CO RR LOAN 6s		

CHART 30

AMERICAN RAILROAD BONDS USED IN CONSTRUCTING INDEX NUMBERS (CONTINUED)

NAME OF RAILROAD BOND	DATE OF ISSUE	DATE OF MATURITY
36. CHICAGO & MILWAUKEE RR 1st M 7s	1893	JUL 1, 1938
37. LAKE SHORE RY DIVIDEND BONDS 7s	1888	MAY 1, 1933
38. CHICAGO & MILWAUKEE RR 2d M 7s	1889	MAY 1, 1934
39. LENOIR VALLEY RR 2d M REG 7s	1870	SEP 1, 1910
40. C & N. N. REST RY CONS SF 7s	1865	FEB 1, 1915
41. L. S. & M. CH. SD CONS 1ST M 3F 7s	1870	JUL 1, 1900
42. PENNSYLVANIA RR CO GEN M 6s	1867	JUL 1, 1910
43. NEW YORK & HARLEM RR CONS M 7s	1872	MAY 1, 1900
44. C. & N. Y. R. RR 1ST 7s	1873	JAN 1, 1900
45. C. & N. Y. R. RR 2ND 7s	1873	JAN 1, 1900
46. CLEVELAND & PITTS CONS SF M 7s	1867	NOV 1, 1900
47. MICHIGAN CENTRAL RR CONS M 7s	1872	MAY 1, 1902
48. CENTRAL PACIFIC RR 1ST M 6s	1865	JUL 1, 1895
49. CHICAGO & N. PAC RR CO M 6s	1877	JUL 1, 1917
50. CHICAGO & N. WEST CONS M 7s	1872	DEC 1, 1902
51. CINC ST PAUL & MINN 1ST M 6s	1878	MAY 1, 1918
52. ST PAUL MINN & MAN 2ND M 6s	1879	OCT 1, 1919
53. ST. LOUIS & N. W. RY 1ST M 6s	1879	MAY 1, 1919
54. ST. P. & SD. DIV. RR 1ST M 6s	1879	MAY 1, 1919
55. C. M. & ST. P. (SO. DIV.) 1ST M 6s	1880	JAN 1, 1910
56. CANADA SOUTHERN RY 1ST M 5s	1877	JAN 1, 1908
57. CINC ST. P. MIN & OMAHA CONS M 6s	1880	JUN 1, 1930
58. ST. P. MIN & MAN (OAK DIV) 1ST M 6s	1880	NOV 1, 1910
59. PHILADELPHIA & ERIE TEN M 5s	1869	JUL 1, 1920
60. C. M. & ST. P. (C & P N. DIV) 1ST M 5s	1881	JAN 1, 1921
61. C. M. & ST. P. (C & P N. DIV) 2ND M 5s	1881	JAN 1, 1921
62. CINC ST. LOUIS & N. OMAHA 5s	1881	JUN 1, 1921
63. PENNSYLVANIA CO DIV 1ST M 4-1/2s	1881	JUL 1, 1921
64. NEW YORK, LACK & WEST 1ST M 6s	1880	JAN 1, 1921
65. HANNAH & ST. JOSEPH CONS M 5s	1881	MAR 1, 1911
66. N. Y. CENT & HUDSON RIVER DEB 5s	1884	SEP 1, 1904
67. BALTIMORE & OHIO 5s	1885	FEB 1, 1925
68. CINC MILW & ST PAUL TEN M 5s	1884	JUL 1, 1904
69. CINC MILW & ST PAUL 1ST M 5s	1884	JUL 1, 1904
70. WEST SUGR RR 1ST M 4s	1885	JAN 1, 1931
71. CHICAGO & N. W. RY DEB 5s	1885	MAY 1, 1935
72. CHICAGO & NORTH WESTERN EXT 4s	1886	MAY 15, 1926
73. ST. PAUL MINN & MAN CONS M 4-1/2s	1885	JUL 1, 1925

CHART 30

AMERICAN RAILROAD BONDS USED IN CONSTRUCTING INDEX NUMBERS (CONTINUED)

NAME OF RAILROAD BOND	DATE OF ISSUE	DATE OF MATURITY	YIELD
74. CIN. IND. ST. L. & CHI. GEN. 1st 48	1885	AUG. 1, 1935	2.75
75. PACIFIC RR. OF MO. 1st EXT. M 48	1869	MAY 1, 1938	2.75
76. ILL. NORT. CENTRAL RR. COLL. 48	1868	MAY 1, 1952	2.75
77. LAKE ERIE & WESTERN 1st M 58	1867	JAN. 1, 1937	2.75
78. WABASH RR. CO. 1st M 58	1869	MAY 1, 1939	2.75
79. CHEE & O. (PENIN. EXT.) 1st M 58	1867	JAN. 1, 1911	2.75
80. ROM. WATER & OCEANS CONS. M 58	1874	JUL. 1, 1922	2.75
81. N. Y. CHIC. & ST. LOUIS 1st M 48	1857	OCT. 1, 1937	2.75
82. CHEE & OHIO RR. 1st CONS. 58	1859	MAY 1, 1939	2.75
83. ILL. CENTRAL (L. M. O. & T.) COL. 48	1892	NOV. 1, 1953	2.75
84. C. & O. (R. & A. DIV.) 1st CONS. M 48	1890	JAN. 1, 1989	2.75
85. C. C. & ST. L. (ST. L. DIV.) 1st CL. 48	1890	NOV. 1, 1980	2.75
86. CHIC. & ST. PAUL GEN. 48	1895	NOV. 1, 1985	2.75
87. L. & N. Y. ST. PAUL & N. Y. 1st M 48	1895	NOV. 1, 1985	2.75
88. ST. PAUL HAW. & N. Y. 1st M 48	1897	JUN. 1, 1937	2.75
89. BALTIMORE & OHIO RR. 1st M 48	1892	JUN. 1, 1949	2.75
90. UNION PAC. RR. 1st M RR. & LS. 48	1897	JUL. 1, 1947	2.75
91. CHICAGO & NORTH WEST GEN. M 3-1/2s	1897	NOV. 1, 1987	2.75
92. CHI. ROCK IS. & PAC. RR. GEN. M 48	1898	JAN. 1, 1998	2.75
93. ATCH. TOP & SANTA FE GEN. M 48	1895	OCT. 1, 1995	2.75
94. N. Y. CHIC. & HUDSON RIVER M 3-1/2s	1897	JUL. 1, 1997	2.75
95. SCIOTO VAL. & NEW ENG. 1st M 48	1895	NOV. 1, 1995	2.75
96. LEHIGH VALLEY (N. Y.) 1st M 44-1/2s	1890	JUL. 1, 1940	2.75
97. LOUISVILLE & NASH. UNIFIED 48	1890	JUL. 1, 1940	2.75
98. OREGON RR. & NAV. CO. CONS. M 48	1896	JUN. 1, 1946	2.75
99. CHI. BUR. & Q. (ILL. DIV.) M 3-1/2s	1899	JUL. 1, 1949	2.75
100. CENTRAL PACIFIC 1st REF. M 48	1899	AUG. 1, 1949	2.75
101. NOR. PAC. RR. PHOEN. LIAISON M 48	1896	JAN. 1, 1997	2.75
102. NOR. PAC. RR. PHOEN. LIAISON M 48	1896	OCT. 1, 1997	2.75
103. CENTRAL RR. OF N. J. GEN. M 58	1897	JUL. 1, 1997	2.75
104. SCOTLAND VAL. 1st CONS. M 44-1/2s	1899	JUL. 1, 1944	2.75
105. ONEIDA & N. Y. ST. L. & N. Y. 1st M 48	1897	JUL. 1, 1947	2.75
106. SOUTHERN PAC. 1st REF. M 48	1905	JAN. 1, 1955	2.75
107. ATL. & S. F. RR. ADJ. M 48	1895	JUL. 1, 1955	2.75
108. ATL. & S. F. RR. ADJ. M 48	1895	JUL. 1, 2047	2.75
109. ATL. & S. F. RR. ADJ. M 48	1895	JUL. 1, 2047	2.75
110. ATL. & S. F. RR. ADJ. M 48	1895	JUL. 1, 2047	2.75
111. ATL. & S. F. RR. ADJ. M 48	1895	JUL. 1, 2047	2.75

CHART 30

AMERICAN RAILROAD BONDS USED IN CONSTRUCTING INDEX NUMBERS (CONCLUDED)

NAME OF RAILROAD BOND	DATE OF ISSUE	DATE OF MATURITY
112. DEL & HUDSON 1ST & REF M 4s	1908 MAY 1, 1943	
113. CENTRAL OF GEORGIA CONS M 5s	1895 NOV 1, 1945	
114. PENNSYLVANIA RR CONS M 4s	1908 MAY 1, 1948	
115. KANSAS CITY SO RY 1ST M 3s	1900 APR 1, 1950	
116. I & M NATL KNOX & CH DIV 34s	1905 MAY 1, 1955	
117. ILLINOIS CENTRAL RR REF M 4s	1908 NOV 1, 1958	
118. CHIC BURL & QUINCY GEN M 4s	1908 MAR 1, 1958	
119. SOUTHERN RY 1ST CONS M 5s	1894 JUL 1, 1994	
120. UN PAC RR 1ST LIEN & REF M 4s	1908 JUN 1, 2008	
121. ATL COAST LINE (L & Y COLL) 4s	1902 OCT 1, 1952	
122. B&O 1ST & 2ND LIEN 4s	1902 DEC 1, 1952	
123. B&O 1ST & 2ND LIEN 4s	1911 OCT 1, 1961	
124. CANADA SO 1ST & REF CONS 5s	1912 OCT 1, 1952	
125. NORFOLK & ESSEX 1ST REF M 3-1/2s	1900 DEC 1, 2000	
126. PENNSYLVANIA RR CONS M 4-1/2s	1915 AUG 1, 1950	
127. CAN NON RY 25 YR SF SER B 5-1/2s	1921 JUL 1, 1946	
128. GAT NON RY GEN SERIED B 5-1/2s	1922 JAN 1, 1952	
129. ATL COAST LINE GEN UNIFIED 4-1/2s	1914 JUN 1, 1964	
130. PENNSYLVANIA RR GEN M 5s	1915 JUN 1, 1955	
131. GAT NON RY GEN SERIES C 5s	1918 DEC 1, 1968	
132. ST LOUIS SOUTHERN 1ST M 4s	1923 JAN 1, 1973	
133. MO-KANSAS-TEXAS RY 1ST M 4s	1890 NOV 1, 1989	
134. CHES & OHIO RY GEN M 4-1/2s	1892 JUN 1, 1992	
135. CLEVELAND INT & ST L GEN M 4s	1893 JUN 1, 1993	
136. NY CENTRAL RR CONSOL M 4s	1913 FEB 1, 1959	
137. TEX & PAC RY 1ST M 5s	1889 JUN 1, 2003	
138. LEHIGH V RY (PA) GEN CONS M 4s	1905 FEBRUARY	
139. CANADIAN PAC RY 45 DES STOCK	1905 APR 1, 1950	
140. SOUTHERN RY DEV & GEN M 4s	1902 JUL 1, 1952	
141. CHIC & SECT IND RY CONS 4s	1925 SEP 1, 1975	
142. CHIC & SECT IND RY CONS M 5s	1925 JUN 1, 1975	
143. CHIC & SECT IND RY CONS M 4-1/2s	1925 JUN 1, 1975	
144. CHIC & SECT IND RY CONS M 4-1/2s	1925 JUN 1, 1975	
145. CHIC & SECT IND RY CONS M 4s	1925 JUN 1, 1975	
146. CHIC & SECT IND RY CONS M 4s	1925 JUN 1, 1975	
147. CHIC & SECT IND RY CONS M 4s	1925 JUN 1, 1975	
148. CHIC & SECT IND RY CONS M 4s	1925 JUN 1, 1975	
149. CHIC & SECT IND RY CONS M 4s	1925 JUN 1, 1975	
150. CHIC & SECT IND RY CONS M 4s	1925 JUN 1, 1975	

TABLE 2

PAPER PRICES OF AMERICAN RAILROAD BONDS, MONTHLY,
JANUARY 1857—JANUARY 1879

This table is intended to aid students who wish original data on railroad bond prices in the paper ('greenback') money period. Gaps in this table occur in months when no sales were made. For identification of the bonds refer by numbers to Table 1.

With the exception of Bond Number 8, all prices in this table are 'flat'. 'Flat' prices are given because that is the form in which they were quoted during the period covered by the table. Since January 1, 1909, it has been the almost universal practice in the United States to quote bonds at 'and interest' prices. In the period from January 1857 to December 1862, inclusive, the quotations for Bond Number 8 are 'and interest' prices for one day in the month. From January 1862 to January 1866 the quotations for Bond Number 8 are 'flat'.

The 'flat' price of a bond is the actual amount of money which changes hands when the bond is sold. The 'and interest' price equals the 'flat' price less the allowance for the accrued portion of the current coupon. Except on interest dates, the 'flat' price is, of course, greater than the 'and interest' price. For a simple discussion of 'flat' and 'and interest' prices, see Justin H. Moore; *Handbook of Financial Mathematics*, pages 434 and 435.

PRICES OF RAILROAD BONDS
JAN. 1857—JAN. 1858

No.	JAN.		FEB.		MAR.		APR.		MAY		JUNE		JULY		AUG.		SEPT.		OCT.		NOV.		DEC.		JAN.		
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	
1	95½	99½	95¾	97¾	96¾	102	97½	100	97½	97½	98½	98	98¾	95	98½	94½	95	90	90	71	80	88½	92	95	96	95	98
2	92½	96	95	97½	97½	102	96	97½	102	96	97½	90	93	95	95	89½	84	84	81	80	85	91½	95	95	90	92	
3	91½	92½	92	92	88½	92	91	88½	92	91	92½	92	92½	92	93¾	89½	80	84	81	81	81	82½	88	85	80	89	
4	82½	82½	81¾	81¾	78	78½	78½	78	78½	78½	78½	79	75	76	75½	78	78½	75	71	60	62½	63½	75	75	73½	69	
5	79	81	81½	81½	82	81½	82½	77	79	79	79	75	76	76	72	75	55	55	60	64	64	59½	62	61	65	71½	
6	70	70¾	71	72	72½	73½	73½	70¾	70¾	70¾	70¾	70¾	71	71	73	73	70¾	70¾	70¾	70¾	70¾	64	64	64	64	71½	
7	80½	80½	80½	80½	80	80½	80½	80½	80	80	80	80	80	80	81	81½	82	82	78	78	73	73	73	73	73	71½	
8	88½	88½	89	89½	88	89½	86	86	86	86	85	85	85	85	85	85½	84	84	84	81	81	80	81	81	81	81	
9	85½	88	88½	89½	88	89½	86½	87½	87½	86½	85	85	85	85	85	85½	85	85	85	85	85	85	85	85	85	85	
10	76½	76½	76	76	76	76½	76½	76½	76½	76½	76½	74	75½	70¾	70¾	71	71	65	65	64	65	64	64	64	69	69	
11	76	76	76½	76½	76½	76½	76½	76½	76½	76½	76½	76½	76½	76½	76½	76½	76½	76½	76½	76½	76½	76½	76½	76½	76½	76½	
12	79¾	80¾	77½	78	76½	77½	77½	77½	77½	77½	77½	77½	77½	77½	77½	77½	77½	77½	77½	77½	77½	77½	77½	77½	77½	77½	
13	86	88½	87½	89	88½	90¾	88½	85	85	87½	84	84	85½	84	87½	86	87	82	84	64	80	81	84	82½	88½	88½	

PRICES OF RAILROAD BONDS
JAN. 1858—JAN. 1859

[illegible]

PRICES OF RAILROAD BONDS
JAN. 1859—JAN. 1860

[illegible]

PRICES OF RAILROAD BONDS

[illegible]

PRICES OF RAILROAD BONDS
JAN. 1861—JAN. 1862

No.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
2	99	100	100	100	96	96	94	94	92	94	93	95	96
3	82	84	82	80	82	80	80	82	85	83	80	83	86
4	82	84	82	80	82	80	80	82	85	83	80	83	86
5	96	99	99	99	99	99	99	99	99	99	99	99	99
6	96	99	99	99	99	99	99	99	99	99	99	99	99
7	96	99	99	99	99	99	99	99	99	99	99	99	99
8	100	100	100	100	100	100	100	100	100	100	100	100	100
9	86	88	87	89	90	91	84	88	82	84	83	85	84
10	100	100	100	100	100	99	99	99	99	99	99	99	99
11	80	80	80	81	83	82	83	82	83	82	81	83	81
12	80	80	80	81	83	82	83	82	83	82	81	83	81
13	91	96	96	97	95	96	92	92	92	92	92	92	92
14	98	103	100	100	102	100	102	100	101	102	100	103	104
15	88	92	93	93	94	93	91	92	92	92	92	93	95
16	96	99	98	101	99	99	99	99	96	95	97	97	99

PRICES OF RAILROAD BONDS
JAN. 1862—JAN. 1863

No.	JAN.	FEB.	MAR.	APR.	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
5	99	101	100	100	101	102	104	106	108	109	109	110	118
6	94	94	98	98	99	100	100	103	103	103	103	103	108
7	98	98	98	98	98	98	98	98	98	98	98	98	110
8	98	98	98	98	98	98	98	98	98	98	98	98	110
9	97	97	97	97	97	97	97	97	97	97	97	97	113
10	80	82	85	86	88	93	94	94	95	95	95	95	110
11	80	82	85	86	88	93	94	94	95	95	95	95	110
12	81	84	84	85	88	93	94	94	95	95	95	95	110
13	91	96	96	97	95	96	92	92	92	92	92	92	112
14	98	103	100	100	102	100	102	100	101	102	100	103	104
15	99	100	100	100	102	100	102	100	101	102	100	103	104
16	85	87	87	87	87	87	87	87	87	87	87	87	112
17	85	87	87	87	87	87	87	87	87	87	87	87	112
18	85	87	87	87	87	87	87	87	87	87	87	87	112
19	85	87	87	87	87	87	87	87	87	87	87	87	112
20	85	87	87	87	87	87	87	87	87	87	87	87	112
21	85	87	87	87	87	87	87	87	87	87	87	87	112

PRICES OF RAILROAD BONDS
JAN. 1863—JAN. 1864

No.	JAN.		FEB.		MAR.		APR.		MAY		JUNE		JULY		AUG.		SEPT.		OCT.		NOV.		DEC.		JAN.	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
5	113 $\frac{1}{2}$	118	117	119	116	112	113	110	112 $\frac{1}{2}$	108	109	108 $\frac{1}{2}$	112	114	111	112	112	112	112	112	108	109	108 $\frac{1}{2}$	109	108	108 $\frac{1}{2}$
6	108 $\frac{1}{2}$	112	113	116 $\frac{1}{2}$	111	112 $\frac{1}{2}$	108	107	107 $\frac{1}{2}$	107	108	108 $\frac{1}{2}$	108 $\frac{1}{2}$	111	110	110	108 $\frac{1}{2}$	108 $\frac{1}{2}$	108 $\frac{1}{2}$	108 $\frac{1}{2}$	106	107	104 $\frac{1}{2}$	105	104 $\frac{1}{2}$	104 $\frac{1}{2}$
7	109	113	112	112	112	108	107	107 $\frac{1}{2}$	107	108	108 $\frac{1}{2}$	108 $\frac{1}{2}$	111	111	107	108 $\frac{1}{2}$	108 $\frac{1}{2}$	108 $\frac{1}{2}$	108 $\frac{1}{2}$	106	107	104 $\frac{1}{2}$	105	104	104	
8	107	113 $\frac{1}{2}$	113 $\frac{1}{2}$	116	114	113 $\frac{1}{2}$	106 $\frac{1}{2}$	110	107	109	108 $\frac{1}{2}$	108 $\frac{1}{2}$	108	108	106	107	108	108 $\frac{1}{2}$	108 $\frac{1}{2}$	106	106	106	106	106	106	
9	107	113 $\frac{1}{2}$	113 $\frac{1}{2}$	116	114	113 $\frac{1}{2}$	106 $\frac{1}{2}$	110	107	109	108 $\frac{1}{2}$	108 $\frac{1}{2}$	108	108	106	107	108	108 $\frac{1}{2}$	108 $\frac{1}{2}$	106	106	106	106	106	106	
10	107	113 $\frac{1}{2}$	113 $\frac{1}{2}$	116	114	113 $\frac{1}{2}$	106 $\frac{1}{2}$	110	107	109	108 $\frac{1}{2}$	108 $\frac{1}{2}$	108	108	106	107	108	108 $\frac{1}{2}$	108 $\frac{1}{2}$	106	106	106	106	106	106	
11	105 $\frac{1}{2}$	106 $\frac{1}{2}$	105	107	104	107 $\frac{1}{2}$	102 $\frac{1}{2}$	104	103 $\frac{1}{2}$	107	109	105	106 $\frac{1}{2}$	106	107 $\frac{1}{2}$	105	108	108	108	108	106	107	105	106	104	103
12	103 $\frac{1}{2}$	107 $\frac{1}{2}$	103 $\frac{1}{2}$	106 $\frac{1}{2}$	103 $\frac{1}{2}$	108	111	113	109	110	107	109	105	106 $\frac{1}{2}$	106	107 $\frac{1}{2}$	105	108	108	108	106	107	105	106	104	103
13	111	116 $\frac{1}{2}$	117	120	108	118	111	113	109	110	107	109	105	106 $\frac{1}{2}$	106	107 $\frac{1}{2}$	105	108	108	108	106	107	105	106	104	103
14	122	123	123	130	118	124 $\frac{1}{2}$	118	119 $\frac{1}{2}$	119 $\frac{1}{2}$	122	116	116	115	116	116	116	116	116	116	116	118	118	115	116	112	112 $\frac{1}{2}$
15	118	128	130	130	128	129	125	125	120	120	116	116	115	116	116	116	116	116	116	116	118	118	115	116	112	112 $\frac{1}{2}$
16	120	122	122	123	116	125	115	122	113	120	116	116	115	116	116	116	116	116	116	116	118	118	115	116	112	112 $\frac{1}{2}$
17	106	112	105	108	110	110 $\frac{1}{2}$	106	106	105	108	105	108	105	108	105	108	105	108	105	108	105	108	105	108	103	103
18	104 $\frac{1}{2}$	110	108 $\frac{1}{2}$	111	110	111	103	106	106 $\frac{1}{2}$	106 $\frac{1}{2}$	105 $\frac{1}{2}$	106	104	105	104 $\frac{1}{2}$	105	105	105	105	105	104 $\frac{1}{2}$	105	104 $\frac{1}{2}$	103	103	103
19	120	120	144 $\frac{1}{2}$	117	114 $\frac{1}{2}$	116	116	116	114	114	114	114	112	112	110	112	112 $\frac{1}{2}$	114	115	111	112 $\frac{1}{2}$	114	113	113	111	112
20	105	114	112	113	110	113 $\frac{1}{2}$	112	113	109 $\frac{1}{2}$	111 $\frac{1}{2}$	109	110	105 $\frac{1}{2}$	109 $\frac{1}{2}$	108 $\frac{1}{2}$	110	111	112 $\frac{1}{2}$	114	112	112 $\frac{1}{2}$	114	112	112	110	109
21	104 $\frac{1}{2}$	115	110 $\frac{1}{2}$	112 $\frac{1}{2}$	108	111	106	111	113 $\frac{1}{2}$	110	110	110	112	106	106 $\frac{1}{2}$	110	111	112 $\frac{1}{2}$	114	112	112 $\frac{1}{2}$	114	112	112	110	109
22	101 $\frac{1}{2}$	110	105	105 $\frac{1}{2}$	109	104 $\frac{1}{2}$	111	106	111	113 $\frac{1}{2}$	110	110	105 $\frac{1}{2}$	109 $\frac{1}{2}$	108 $\frac{1}{2}$	110	111	112 $\frac{1}{2}$	114	112	112 $\frac{1}{2}$	114	112	112	110	109
23	100	109	104	113	106	111 $\frac{1}{2}$	108	109	111 $\frac{1}{2}$	112	107	108	109	109	105	108	109	109	109	109	109	109	109	109	109	109
24	109	110	109	110	111 $\frac{1}{2}$	108	109	111 $\frac{1}{2}$	108	109	111 $\frac{1}{2}$	108	109	111 $\frac{1}{2}$	108	109	111 $\frac{1}{2}$	108	109	111 $\frac{1}{2}$	108	109	111 $\frac{1}{2}$	108	109	111 $\frac{1}{2}$
25	109	117 $\frac{1}{2}$	117	118	117	117	106	110	110	110	112	106 $\frac{1}{2}$	110	102	107 $\frac{1}{2}$	106	108	106	108	108	109	110	107	108 $\frac{1}{2}$	104	107

PRICES OF RAILROAD BONDS
JAN. 1864—JAN. 1865

No.	JAN.		FEB.		MAR.		APR.		MAY		JUNE		JULY		AUG.		SEPT.		OCT.		NOV.		DEC.		JAN.	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
5	108	108½	108	109	110	112	115	116	109	111	110	111	116	120	115	119	104½	106	106	110	107	102½	105	105	102	105½
6	104½	104½	104½	104½	105	105½	106	106	109	109	109	109	113	117½	113½	115	107½	106	107½	102½	107½	102½	108½	106½	107½	104½
7	104½	104½	105	105	103½	103½	103½	103½	106½	103½	107	102½	102½	102½	102½	106	107½	102½	107½	102½	108½	106½	107½	104½	105½	
8	103	103	100½	103	110	112	111	113	111½	112	112	115	120	121	119	121	113	113	106	108	107½	108½	106½	107½	104½	
9	106	106	107	109	110	112	111	113	111½	112	112	115	120	122½	123	125	123	123	109½	115	112	114	111½	111½	105½	
10	107	107½	108	112½	112½	113½	115	115	117	117	117	120	122½	125	123	125	123	123	109½	115	112	114	111½	111½	105½	
11	100½	101	100	101	102	103½	107	109½	107	107	107	107½	107½	107½	108½	108½	103	103	100	108½	100	102	100	100	99	100
12	103	103½	100½	100½	103	105	108	107	107	107	107	107½	106½	109½	106½	108	100	108½	100	101	102	100	101	100	101½	
13	104	106	105½	108	107	110	109½	112	109	111½	114	114	123½	117	123	114	117	117	100	111	108	110	104	101	102	105
14	117½	117½	113	114	114	116	117	118	118	118	118	118	126	135	130	133	130	130	100	111	108	110	104	101	102	105
15	118	118	119	120	119	128½	125	128	126	128	128	130	133	135	135	137	137	137	100	111	108	110	104	101	102	105
16	113½	116½	116	116½	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116
17	103	103	103	107	107	107	108	107	110	109½	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
18	103	103	103	107	107	107	108	107	110	109½	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
19	111½	112	110	113½	115	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116
20	107	109	110	111	111	113½	115	115	110	112	113	117	116	121	115½	117	110	116½	105	110	106½	108½	106	106½	105	105
21	106½	108	109	110	112½	115	117	118	115	118	116	120	113½	115	114	116	111	114½	106	108	106	108	107	104	106	106
22	99½	100½	99½	101	100½	102½	101½	101½	101½	101½	101½	101½	100½	100½	100½	100½	100½	100½	100½	100	100	100	100	103½	104	105
23	103½	104½	104	108	110	109	110½	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
24	92	102	100½	103	105	110	108½	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110
25	104	107	104	108	108	113	113½	114½	115	118½	119	122	127	130	128	130	115	123	109	106	106	106	106½	106½	107	107
26	105½	105½	104	105	108	108½	112	114½	116	111½	109½	114	116½	116½	118	106	114	106½	107	106	106	106	106	107	105	109½

PRICES OF RAILROAD BONDS

No.	JAN.		FEB.		MAR.		APR.		MAY		JUNE		JULY		AUG.		SEPT.		OCT.		NOV.		DEC.		JAN.	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
8	102 1/2	105	99	103	99 1/2	100 1/2	99 1/2	100 1/2	99 1/2	99 1/2	99 1/2	99 1/2	100	100	94	100	94	101 1/2	93 1/4	93 1/4	91	95	94 1/2	94 1/2	94	95 1/2
9	104 1/2	105 1/2	103	104	99	101 1/2	97 1/2	102 1/2	99 1/2	98 1/2	98 1/2	98 1/2	98 1/2	98 1/2	101	102	101 1/2	101 1/2	98 1/2	98 1/2	93 1/4	93 1/4	94 1/2	94 1/2	94 1/2	95 1/2
10	105 1/2	107	106 1/2	107 1/2	101 1/2	106	103 1/2	101 1/2	103 1/2	103 1/2	104 1/2	104 1/2	104 1/2	104 1/2	101	102	104	104 1/2	99	104	98 1/2	98 1/2	98 1/2	98 1/2	94 1/2	95 1/2
11	99	100	99 1/2	100	99 1/2	100	99 1/2	100	99 1/2	100	99 1/2	100	99 1/2	100	98 1/2	98 1/2	88	90	89 1/2	90	90	90	90	90	94 1/2	95 1/2
12	100	101 1/2	100 1/2	101 1/2	99 1/2	100 1/2	99 1/2	100 1/2	99 1/2	100 1/2	100 1/2	100 1/2	100 1/2	100 1/2	94	95	88	90	93 1/4	93 1/4	93 1/4	93 1/4	93 1/4	93 1/4	93 1/4	94 1/2
13	102	106 1/2	103 1/2	108 1/2	98 1/2	104 1/2	99 1/2	100 1/2	100 1/2	100 1/2	100 1/2	100 1/2	100 1/2	100 1/2	94	95	88	90	93 1/4	93 1/4	93 1/4	93 1/4	93 1/4	93 1/4	93 1/4	94 1/2
14	111	111 1/2	112 1/2	115	109	112	112 1/2	114	111	113	110	112	110	109	109 1/2	109 1/2	110 1/2	111	112	112	112 1/2	112 1/2	112 1/2	112 1/2	109	109
15	105	108 1/2	105	109	106	107	103 1/2	105	105	105	100	102	100	100	102	102	102 1/2	102 1/2	102 1/2	102 1/2	103	103	106	101	101	101
16	102	107	99	99	99	95	100	95	100	95	92 1/2	92 1/2	97	97	94	94 1/2	94	95	90	91 1/2	86 3/4	90	88 1/2	91	92	
17	102	103	99	99	99	95	100	95	100	95	92 1/2	92 1/2	93	93	94	94 1/2	94	95	90	91 1/2	86 3/4	90	88 1/2	91	92	
18	100	103	99	99	99	95	100	95	100	95	92 1/2	92 1/2	93	93	94	94 1/2	94	95	90	91 1/2	86 3/4	90	88 1/2	91	92	
19	95	105 1/2	103 1/2	104	103	103	100	98	99	96	96 1/2	97 1/2	97 1/2	97 1/2	96	97	96 1/2	97	97	98	94	95	87	94	96	
20	104	106	104	104	95	100	96	98	96	96	96	96 1/2	97	97	94	98	95	96	90	98	99	98	99	99	99	
21	96	96	96	96	96	96	96	96	96	96	96	96 1/2	97	97	94	98	95	96	90	98	99	98	99	99	99	
22	96	96	96	96	96	96	96	96	96	96	96	96 1/2	97	97	94	98	95	96	90	98	99	98	99	99	99	
23	105	107	100	101	98	100	98	100	98	98	98	98 1/2	99	99	93	93	93	93	95	95	95	95	95	95	94	94
24	101	105	103 1/2	105	99	100	98	100	98	98	98	98 1/2	99	99	93	93	93	93	95	95	95	95	95	95	94	94
25	107	109 1/2	108 1/2	110	100	108 1/2	100	100	108	100	104 1/2	100	103 1/2	103 1/2	98	98	103	105	102	102	103	103	102	100	100	100 1/2
26	105	107	104 1/2	105	96	104	98	104	98	102	99 1/2	98 1/2	97 1/2	97 1/2	98	100	99 1/2	100 1/2	100 1/2	100 1/2	93	94	91	93	90 1/2	91

PRICES OF RAILROAD BONDS
JAN. 1866—JAN. 1867

[illegible]

A27

JAN. 1867—JAN. 1868

[illegible]

JAN. 1868—JAN. 1869

[illegible]

PRICES OF RAILROAD BONDS
JAN. 1869—JAN. 1870[illegible]

PRICES OF RAILROAD BONDS JAN. 1870—JAN. 1871

[illegible]

A29

No.	JAN.		FEB.		MAR.		MAY		JUNE		JULY		AUG.		SEPT.		OCT.		NOV.		DEC.		JAN.	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
1	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	87	89	90
2	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
3	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
4	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
5	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
6	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
7	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
8	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
9	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
10	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
11	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
12	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
13	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
14	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
15	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
16	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
17	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
18	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
19	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
20	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
21	03	04	01	01	04	04	03	03	03	03	03	03	03	00	00	00	00	00	00	00	01	88	91	93
22	03	04																						

No.	JAN.		FEB.		MAR.		APR.		MAY		JUNE		JULY		AUG.		SEPT.		OCT.		NOV.		DEC.		JAN.	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
12	01	93	01	91	01	90	02	91	02	91	03	92	03	93	00	92	01	92	01	93	02	92	01	91	02	95
13	01	93	01	91	01	90	02	91	02	91	03	92	03	93	00	92	01	92	01	93	02	92	01	91	02	95
14	01	93	01	91	01	90	02	91	02	91	03	92	03	93	00	92	01	92	01	93	02	92	01	91	02	95
15	13	115	14	113	13	111	13	113	113	113	115	115	115	113	113	113	113	113	112	112	111	112	111	113	111	112
16	104	106	106	107	106	105	105	105	105	105	104	104	104	105	105	105	107	107	106	106	104	102	105	102	103	103
20	103	104	103	104	104	103	104	103	102	102	102	102	102	103	102	103	102	102	104	101	109	102	103	103	104	104
21	103	103	103	103	100	102	103	103	103	103	105	105	105	105	105	105	105	105	103	106	102	103	103	103	104	104
22	103	105	105	105	104	105	105	105	105	105	105	105	105	105	105	105	105	105	103	106	102	103	103	103	104	104
23	03	93	03	91	03	90	04	93	04	93	05	04	04	04	04	04	04	04	04	04	04	04	03	03	04	04
24	03	93	03	91	03	90	04	93	04	93	05	04	04	04	04	04	04	04	04	04	04	04	03	03	04	04
25	03	93	03	91	03	90	04	93	04	93	05	04	04	04	04	04	04	04	04	04	04	04	03	03	04	04
26	03	93	03	91	03	90	04	93	04	93	05	04	04	04	04	04	04	04	04	04	04	04	03	03	04	04
27	09	102	97	100	97	98	97	98	97	98	97	98	97	98	97	98	97	98	98	99	94	96	94	95	94	97
28	98	99	97	100	97	98	97	98	97	98	97	98	97	98	97	98	97	98	98	99	94	96	94	95	94	97
29	91	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	94	96	96	97	98	99	100
30	103	106	105	106	105	105	105	105	105	105	104	104	104	105	105	105	105	105	103	89	89	101	100	101	99	100
31	103	106	105	106	105	105	105	105	105	105	104	104	104	105	105	105	105	105	103	89	89	101	100	101	99	100
32	109	112	106	107	107	107	107	107	107	108	107	108	108	110	107	107	107	107	103	103	104	102	101	102	101	101
33	04	95	04	96	04	95	04	96	04	95	04	04	04	04	04											

PRICES OF RAILROAD BONDS

JAN. 1873—JAN. 1874

No.	JAN.		FEB.		MAR.		APR.		MAY		JUNE		JULY		AUG.		SEPT.		OCT.		NOV.		DEC.		JAN.	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
16	102½	103	104	104½	103½	104½	104½	104½	103	104	103½	104½	104	105	104	104½	104½	105	102	103½	106	100	101	101	101	102½
20	103	104	103	103½	104	105	104½	105	101	103	104½	104½	104	105	104	104½	104½	105	102	103½	106	100	101	101	101	102½
21	99½	102	101	101½	101	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102½
24	100½	102½	102½	103½	102	103½	103½	104	104	105½	104	105½	106	106½	105	106	106½	106	101	103	103½	101	101	103	104	103
25	102½	105	104	105½	106	109½	104	104	106	107	107½	107½	106	106½	105	106	106½	106	101	103	103½	101	101	103	104	103
26	94¾	97	96	97	95½	97½	96	97	94¾	95	94	96½	96½	97	95½	96	96½	96	91	96½	91	94	91	93	94½	99
27	99¾	100	95½	96½	95	96	96	96½	96	96	96½	96	98	97½	95	96½	95½	96	90	93	90	93	94	94½	97	98½
28	99	100	92	92½	92	92½	91½	92	91½	92	91½	92	91½	92	91½	92	91½	92	93	93	90	97	99½	99	100	100
29	91¾	91¾	91¾	91¾	92	92½	91½	92	91½	92	91½	92	91½	92	91½	92	91½	92	93	93	90	97	99½	99	100	100
30	104	105	104½	106	105	106	104½	106	102	104	104½	104½	105	105	105½	105½	105½	105	102	103½	106	100	101	101	101	102½
31	103½	104	103	103½	103	103½	103	103½	102	104	104½	104½	104	105	104	104½	104½	105	102	103½	106	100	101	101	101	102½
32	103½	104	103	103½	103	103½	103	103½	102	104	104½	104½	104	105	104	104½	104½	105	102	103½	106	100	101	101	101	102½
33	94½	95½	95	95½	95	95½	95	95½	95	95	95½	95	95	95	95	95½	95	95	95	95	95	95	95	95	95	95
34	105	106½	102½	103½	103½	104	102½	103½	103½	105	106	107	107½	107½	104	105	105½	105	102	103½	106	100	101	101	101	102½
35	92½	94	93½	93½	93½	93½	93½	94	92	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½
36	93	94	93½	93½	93½	93½	93½	94	92	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½
37	93	94	93½	93½	93½	93½	93½	94	92	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½
38	101	102½	103	102½	103	102½	103	103	101½	101½	102½	103	103½	104	103½	104	103½	104	102	103½	106	100	101	101	101	102½
39	103½	105½	106	106½	106	106½	106	106½	106	106	106½	106½	106	106	106	106½	106½	106	102	103½	106	100	101	101	101	102½
40	91	92½	90½	91½	90½	91½	90½	91½	89	89½	89½	89½	90	91½	90½	91½	90½	91½	88	89	88	88	88	88	88	89
41	96	101	96	101	96	101	96	101	96	101	96	101	96	101	96	101	96	101	83	86	78	88	88	88	88	89
42	96	101	96	101	96	101	96	101	96	101	96	101	96	101	96	101	96	101	83	86	78	88	88	88	88	89

PRICES OF RAILROAD BONDS

JAN. 1874—JAN. 1875

No.	JAN.		FEB.		MAR.		APR.		MAY		JUNE		JULY		AUG.		SEPT.		OCT.		NOV.		DEC.		JAN.	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
16	101	102½	105	104½	105	104½	106	106	105	105½	103½	104½	104	105	103	103½	103½	103½	106½	106	108	108	105	105	106½	106½
20	102	103	103½	103½	104½	105	105½	106	101	103	104½	104½	104	105	103	103½	103½	103½	105	105	106	106	106	106	106½	106
21	101	101½	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101
24	103	103	105	105	105	105	105	105	103	104	104	104	104	104	104	104	104	104	103	103	103	103	103	103	103	103
25	104	105	105½	106½	106½	106½	106½	106½	105	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106
26	94	95	96½	97	96	97	96	97	94	95	94	96	96	97	95	96	96	96	109	109	109	109	109	109	109	109
27	99	100	95½	96½	95	96	96	96½	96	96	96½	96	98	97½	95	96½	95½	96	103	103	103	103	103	103	103	103
28	99	100	92	92½	92	92½	91½	92	91½	92	91½	92	91½	92	91½	92	91½	92	107	107	107	107	107	107	107	107
29	91¾	91¾	91¾	91¾	92	92½	91½	92	91½	92	91½	92	91½	92	91½	92	91½	92	107	107	107	107	107	107	107	107
30	104	105	104½	106	105	106	104½	106	102	104	104½	104½	105	105	105½	105½	105½	105	102	103½	106	100	101	101	101	102½
31	103½	104	103	103½	103	103½	103	103½	102	104	104½	104½	104	105	104	104½	104½	105	102	103½	106	100	101	101	101	102½
32	103½	104	103	103½	103	103½	103	103½	102	104	104½	104½	104	105	104	104½	104½	105	102	103½	106	100	101	101	101	102½
33	94½	95½	95	95½	95	95½	95	95½	95	95	95½	95	95	95	95	95½	95	95	95	95	95	95	95	95	95	95
34	105	106½	102½	103½	103½	104	102½	103½	103½	105	106	107	107½	107½	104	105	105½	105	102	103½	106	100	101	101	101	102½
35	92½	94	93½	93½	93½	93½	93½	94	92	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½
36	93	94	93½	93½	93½	93½	93½	94	92	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½
37	93	94	93½	93½	93½	93½	93½	94	92	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½	92½
38	101	102½	103	102½	103	102½	103	103	101½	101½	102½	103	103½	104	103½	104	103½	104	102	103½	106	100	101	101	101	102½
39	103½	105½	106	106½	106	106½	106	106½	106	106	106½	106½	106	106	106	106½	106½	106	102	103½	106	100	101	101	101	102½
40	91	92½	90½	91½	90½	91½	90½	91½	89	89½	89½	89½	90	91½	90½	91½	90½	91½	88	89	88	88	88	88	88	89
41	95	96½	96	97	97	97½	98	98	86	86½	86½	86½	87½	88½	86½	87½	86½	87½	93	93	93	93	93	93	93	93
42	88	90	89½	90½	89	90½	90½	90½	89½	89½	90½	90½	90½	90½	90½	90½	90½	90½	93	93	93	93	93	93	93	93

RAILROAD BOND YIELDS

A31

PRICES OF RAILROAD BONDS
JAN. 1875—JAN. 1876

No.	JAN.		FEB.		MAR.		APR.		MAY		JUNE		JULY		AUG.		SEPT.		OCT.		NOV.		DEC.		JAN.	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
24	1055	107	109	1082	110	113	113	113	113	113	114	114	109	110	110	110	110	113	112	112	115	115	115	112	112	
25	1055	107	109	1082	110	113	113	113	113	113	114	114	109	110	110	110	110	113	112	112	115	115	115	112	112	
26	1055	107	109	1082	110	113	113	113	113	113	114	114	109	110	110	110	110	113	112	112	115	115	115	112	112	
28	1044	105	104	1034	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	
29	97	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99		
30	1082	110	110	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113		
31	104	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105	105		
32	101	102	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103		
34	1082	109	107	109	110	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113		
35	98	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100		
36	1055	107	109	1082	110	113	113	113	113	113	114	114	109	110	110	110	110	113	112	112	115	115	115	112	112	
37	1055	107	109	1082	110	113	113	113	113	113	114	114	109	110	110	110	110	113	112	112	115	115	115	112	112	
38	1055	107	109	1082	110	113	113	113	113	113	114	114	109	110	110	110	110	113	112	112	115	115	115	112	112	
39	1055	107	109	1082	110	113	113	113	113	113	114	114	109	110	110	110	110	113	112	112	115	115	115	112	112	
40	97	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98		
41	1055	107	109	1082	110	113	113	113	113	113	114	114	109	110	110	110	110	113	112	112	115	115	115	112	112	
42	94	97	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98	98		
43	1055	107	109	1082	110	113	113	113	113	113	114	114	109	110	110	110	110	113	112	112	115	115	115	112	112	
44	1102	112	112	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113		
45	102	102	102	103	103	104	104	104	104	104	105	105	105	105	105	105	105	105	105	105	105	105	105	105		

PRICES OF RAILROAD BONDS
JAN. 1876—JAN. 1877

No.	JAN.		FEB.		MAR.		APR.		MAY		JUNE		JULY		AUG.		SEPT.		OCT.		NOV.		DEC.		JAN.	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
24	112	112	115	115	115	116	117	117	118	118	117	118	120	118	120	118	121	117	117	118	118	122	121	117	115	116
25	114	115	115	116	117	117	119	119	120	120	119	121	120	120	120	120	121	120	120	120	122	122	121	117	119	119
26	106	104	106	103	106	105	106	105	103	103	104	103	105	106	107	107	108	107	108	107	108	109	109	109	110	110
27	103	103	103	103	106	106	106	106	106	106	111	111	111	111	108	108	107	107	107	108	107	109	107	107	108	110
28	106	106	106	106	106	106	106	106	106	106	103	103	105	105	103	103	102	106	105	105	105	103	103	104	104	104
29	108	108	108	108	108	108	108	108	108	108	114	114	117	117	110	110	109	109	114	114	108	111	111	109	109	110
30	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114
31	108	108	108	108	108	108	108	108	108	108	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114
32	115	115	114	114	115	116	116	116	116	116	115	116	118	118	115	117	116	117	116	116	116	116	116	118	118	118
33	104	104	104	103	106	106	106	106	107	107	105	107	106	106	106	106	106	107	107	108	109	108	109	110	110	110
34	105	105	105	105	105	105	105	105	105	105	110	112	114	116	112	113	103	103	103	103	103	102	103	103	103	103
35	104	104	104	104	104	104	104	104	104	104	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103
36	102	102	102	102	102	102	102	102	102	102	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103
37	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103	103
38	106	106	108	109	109	109	111	110	111	107	108	108	109	109	108	108	105	105	105	104	105	105	103	105	106	107
39	111	113	114	114	114	114	114	114	114	109	110	110	113	113	110	114	111	111	110	111	112	114	114	115	115	115
40	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109
41	102	102	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104
42	100	100	103	104	104	105	104	105	104	105	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106
43	115	117	117	119	118	121	120	121	120	121	118	118	121	121	121	120	118	119	119	119	117	118	117	119	119	120
44	120	122	120	122	122	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123	123
45	107	108	108	109	109	109	110	110	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111

PRICES OF RAILROAD BONDS
JAN 1877—JAN. 1878

No.	JAN.		FEB.		MAR.		APR.		MAY		JUNE		JULY		AUG.		SEPT.		OCT.		NOV.		DEC.		JAN.	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
24	115	116	115 ¹	115 ¹	113 ¹	115	113 ¹	115 ¹	114 ¹	115	117	118 ³	117	117	118	118	115	115	114	114 ³	114	115	114	115	111 ¹	111 ¹
25	117	119	120	121	120	120	120	120	120	121	120 ¹	122	117	119	119	118	118	118	117	118	118	120	120	120	120 ¹	118 ¹
26	109	110	109 ¹	110	108	109 ¹	107	108	104	108	107	108	107 ¹	109	109	111	111	111	111	111	107	107	107	107	109	109 ¹
28	107	108	108 ¹	110	108	108 ¹	107	108	111	111	110	112	110	110	110	110	110	110	110	110	110	110	110	110	110	110
30	116	116	113	115	116 ¹	115	115	115	116	115	115	115	118	115	118	114 ¹	116 ¹	115	118	115	118	144 ¹	145 ¹	145 ¹	145 ¹	116
31	109	110	110	112	114	114	115	115	115	115	112	115	113	114	113	115	113	115	112	112	110	110	111	112	110	
32	117	118	114	114	114 ¹	115	115	115	118	118	117	118	117	119	113	115	113	115	113	115	113	117	117	120	119	
33	109	111	106	109	108	108	106	106	106	108	106	107	107	109	108	108	108	108	109	109	110	108	108	108	109	
34	105	111	101	106	101	105	104	108	107	110	109	110	107	114	109	111	109	101	109	110	110	112	112	113	114	
35	104	104	100	104	99	100	98	100	103	103	100	101	101	101	101	102	101	102	101	101	101	101	101	101	101	
37	104	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	106	
38	108	110	109	110	109	108	109	108	109	106	107	108	107	109	109	109	109	109	109	109	109	109	109	109	109	
39	115	115	109	115	106	110	105	108	107	110	109	110	111	112	110	113	110	111	111	112	113	133	143	144	115	
40	104	104	103	104	104	106	105	106	104	106	106	106	107	106	107	105	106	107	106	107	106	107	108	108	109	
41	104	105	107	107	106	107	106	106	106	107	109	109	109	109	109	108	108	108	109	109	110	111	112	109	109 ¹	
42	108	108	108	108	106	107	107	107	108	107	108	107	108	105	106	108	105	107	106	106	106	107	107	106	107	
43	119	120	120	120	121	117	118	117	117	118	116	117	117	118	119	119	119	119	119	119	119	119	119	119	120	
44	117	118	115	117	114	116	118	118	118	118	112	120	120	117	118	118	117	118	117	119	119	120	120	120	118	
45	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	109	

PRICES OF RAILROAD BONDS

No.	JAN.		FEB.		MAR.		APR.		MAY		JUNE		JULY		AUG.		SEPT.		OCT.		NOV.		DEC.		JAN.	
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High
24	111%	114%	...	...	115	115	116	116	115%	116	117%	117%	114%	114%	114%	115	114%	115	114%	115	117	117	117	113%	116
25	117%	118%	118	118	119	119	119	119	119	119	120	121	120	121	118	119	119	120	118%	119	121	121	121	120	121	
26	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	109	112	
27	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
28	107	107	107	107	110	110	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	111	
29	115%	116	116	117	117	119	119	120	116	117	118	118	118	119	118	119	118%	119	117%	119%	119	119	117	117	118	
30	113	113	113	113	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	
31	110	111	112	112	112	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	113	
32	119	122	116	117	116	118	117	118	118	118	121	121	121	122	118	119	116	115	116	116	116	116	116	116	116	
33	108	109	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	
34	112%	114%	109	110	109	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	
35	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	
36	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	104	
37	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	
38	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	108	
39	114	115	112	112	113	113	114	113	114	113	114	114	115	116	113	114	115	116	116	116	116	116	116	116	116	
40	108	109	107	108	107	108	107	108	109	108	110	109	110	111	112	110	110	110	110	110	110	110	110	110	110	
41	109	109	109	109	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	
42	106	107	107	107	106%	106%	106%	106%	106%	106%	106%	106%	106%	106%	106%	106%	106%	106%	106%	106%	106%	106%	106%	106%	106%	
43	119	120	119	120	119	120	119	120	119	120	119	120	119	120	119	120	119	120	119	120	119	120	119	120	119	
44	118	119	118	119	118	119	118	119	118	119	118	119	118	119	118	119	118	119	118	119	118	119	118	119	118	
45	109	109	109	109	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	
46	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	110	
47	105	107	106	107	106	108	108	107	109	108	109	109	108	110	111	112	111	112	111	112	111	112	111	113	115	

TABLE 3

YIELDS OF AMERICAN RAILROAD BONDS, MONTHLY,
JANUARY 1857—JANUARY 1936

This table gives for each month the yield of each bond if held to maturity. The yields are based on the assumption that each bond is bought at the middle of the month and costs the arithmetic average of the highest and lowest prices of the month. The italicised yields are not based on actual price quotations but are interpolated. For a more complete description of the bonds used in this table see Table 1.

This is a 'currency' or 'dollar' yield table. In other words all calculations have been based on the assumption that the buyers and sellers were interested only in legal tender without reference to its gold, 'commodity', or other exchange value. For example, if on Jan. 15th, 1863, an individual bought for \$1000 in greenbacks a one thousand dollar 6% bond maturing in exactly ten years and received as interest \$30 in greenbacks every 6 months until maturity and \$1030 in greenbacks at maturity, he would consider that he had received 6% on his investment throughout the ten years without any reference to how many ounces of gold he could have bought with the original 1000 greenback dollars or with any or all of the greenback interest payments or the 1030 greenback dollars received January 15, 1873.

The yields in this table therefore correspond to those which would be obtained by entering an ordinary bond yield table with the dollar (or 'greenback') purchase price. This was, of course, the form in which the prices were actually quoted throughout the period.

YIELDS OF RAILROAD BONDS
JAN. 1857—JAN. 1858

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1	Hudson River RR 1st M 7s 1869	7.72	7.49	7.48	7.54	7.52	7.58	7.86	7.74	8.56	10.15	8.45	7.99	7.92
2	Chicago & Rock Is RR 1st M 7s 1870	7.83	7.69	7.18	7.10	7.10	8.47	8.13	8.42	9.33	10.08	8.65	8.15	8.28
3	Chicago & Rock Is RR 2nd M 6s 1870	6.77	6.79	6.85	6.92	6.82	6.83	6.67	7.01	7.67	7.88	7.85	7.25	7.05
4	Phila & Reading RR 2nd M 6s 1870	8.47	8.59	8.78	8.87	8.88	8.86	9.12	9.27	10.81	11.84	10.63	10.16	10.01
5	New York & Harlem RR 1st M 7s 1873	9.64	9.55	9.54	9.64	9.80	10.27	10.32	10.80	12.95	13.32	11.93	11.85	11.32
6	Lehigh Valley RR 1st M 6s 1873	9.84	9.76	9.71	9.50	9.65	9.46	9.52	9.57	10.11	11.14	11.17	10.89	10.38
7	Morris Canal & B Co 1st M 6s 1876	8.36	8.28	8.29	8.33	8.38	8.46	8.97	9.58	10.52	10.99	10.14	9.25	9.28
8	Eastern RR (Mass) 6s 1874	8.08	8.08	8.16	8.29	8.31	8.68	8.89	8.96	9.85	10.24	9.73	9.29	9.11
9	Pennsylvania RR 2nd M 6s 1875	7.33	7.24	7.41	7.39	7.51	7.68	7.75	7.70	7.99	8.46	9.00	8.93	8.94
10	Pennsylvania RR 1st M 6s 1880	6.27	6.17	6.27	6.38	6.40	6.52	6.27	6.10	6.53	7.29	7.04	6.66	6.48
11	Camden & Amboy 6s Jan 1889	8.18	8.21	8.31	8.33	8.38	8.70	8.90	9.04	9.78	9.95	10.09	9.60	9.08
12	Camden & Amboy 6s 1883	8.09	8.04	8.16	8.29	8.31	8.68	8.89	8.96	9.85	10.24	9.73	9.29	9.11
13	N Y C RR debt certificates 6s 1883	7.18	7.13	7.05	7.18	7.18	7.37	7.34	7.32	8.90	9.11	7.44	7.63	7.38

YIELDS OF RAILROAD BONDS
JAN. 1858—JAN. 1859

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1	Hudson River RR 1st M 7s 1869	7.92	7.34	7.53	7.47	7.17	7.05	7.06	6.97	7.03	6.96	6.82	6.86	7.05
2	Chicago & Rock Is RR 1st M 7s 1870	8.18	8.12	7.86	7.85	7.73	7.64	7.81	7.77	7.82	7.97	7.93	7.67	7.89
3	Chicago & Rock Is RR 2nd M 6s 1870	7.05	6.73	6.74	6.69	6.74	6.34	6.32	6.33	6.43	6.41	6.31	6.27	6.39
4	Phila & Reading RR 2nd M 6s 1870	10.52	9.74	9.52	9.89	9.81	9.83	9.16	9.37	8.99	8.53	8.48	8.47	8.47
5	New York & Harlem RR 1st M 7s 1873	11.32	9.62	9.50	9.47	9.34	9.44	9.17	9.20	9.18	8.63	8.58	8.52	7.92
6	Lehigh Valley RR 1st M 6s 1873	10.38	9.66	9.23	8.84	8.47	8.31	8.40	8.26	8.22	7.82	7.49	7.52	7.46
7	Morris Canal & B Co 1st M 6s 1876	9.28	8.89	8.41	8.29	8.25	8.12	8.02	7.96	7.63	7.37	7.32	7.31	7.39
8	Eastern RR (Mass) 6s 1874	8.08	7.73	6.81	6.81	6.86	6.65	6.81	6.93	7.04	7.04	6.66	6.61	6.72
9	Pennsylvania RR 2nd M 6s 1875	8.44	7.79	7.45	7.55	7.60	7.58	7.54	7.48	7.18	7.01	7.04	6.95	6.94
10	Pennsylvania RR 1st M 6s 1880	6.48	6.44	6.18	6.28	6.23	6.14	6.11	6.15	6.10	5.98	5.93	5.92	5.94
11	Camden & Amboy 6s Jan 1889	9.08	8.98	8.63	8.30	7.96	8.06	7.17	7.95	7.68	7.36	7.38	7.53	7.34
12	Camden & Amboy 6s 1883	9.11	8.98	8.53	8.20	7.95	8.11	7.15	7.98	7.68	7.36	7.35	7.53	7.35
13	N Y C RR debt certificates 6s 1883	7.38	7.08	6.99	6.95	7.07	7.07	7.05	7.05	7.00	6.77	6.82	6.85	7.00
14	N Y C RR for debts assumed 7s 1876	7.86	7.47	7.35	7.51	7.50	7.57	7.56	7.54	7.55	7.18	7.08	7.19	7.60
15	Chic Burl & Quincy 1st M 8s 1853	10.00	9.49	9.05	9.23	9.38	9.47	9.58	9.56	9.81	9.64	9.53	9.45	9.66

YIELDS OF RAILROAD BONDS

JAN. 1859—JAN. 1860

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1	Hudson River RR 1st M 7s 1869	7.05	6.89	6.81	6.74	6.58	6.73	6.79	6.61	6.88	6.84	6.79	6.84	6.58
2	Chicago & Rock Is RR 1st M 7s 1870	7.89	7.97	7.78	7.87	8.24	8.60	8.69	8.66	8.01	8.40	8.30	8.20	8.30
3	Lehigh Coal & Nav Co gen M 6s 1870	6.39	6.43	6.53	6.52	6.61	6.89	6.79	6.72	6.61	6.60	6.40	6.32	6.09
4	Phila & Reading RR 2nd M 6s 1870	8.47	8.70	8.30	8.73	9.03	9.13	8.98	9.14	9.32	9.25	9.09	9.25	9.50
5	New York & Harlem RR 1st M 7s 1873	7.92	8.21	8.06	8.00	8.22	8.41	8.28	8.20	7.99	8.19	8.09	7.93	7.97
6	Lehigh Valley RR 1st M 6s 1873	7.46	7.36	7.46	7.28	7.83	7.61	7.73	7.68	7.44	7.40	7.53	7.64	7.59
7	Morris Canal & B Co 1st M 6s 1876	7.39	7.23	7.08	7.06	7.12	7.60	7.50	7.48	7.32	7.34	7.52	7.57	7.45
8	Eastern RR (Mass) 6s 1874	6.72	6.51	6.40	6.51	6.51	6.62	6.62	6.52	6.30	6.31	6.47	6.31	6.26
9	Pennsylvania RR 2nd M 6s 1875	6.94	6.97	6.94	7.01	7.27	7.52	7.62	7.63	7.43	7.54	7.53	7.60	7.67
10	Pennsylvania RR 1st M 6s 1880	5.94	5.95	6.00	5.98	6.02	6.19	6.13	6.07	6.11	6.15	6.19	5.98	6.08
11	Camden & Amboy 6s Jan 1889	7.34	7.13	7.43	7.47	7.63	7.75	7.54	7.72	7.58	7.46	7.59	7.60	7.63
12	Camden & Amboy 6s 1883	7.45	7.21	7.51	7.48	7.54	7.76	7.71	7.72	7.59	7.54	7.71	7.81	7.64
13	N Y C RR debt certificates 6s 1883	6.83	6.84	6.85	6.76	6.72	6.94	7.01	6.94	6.79	6.78	6.77	6.81	6.89
14	N Y C RR for debts assumed 7s 1876	7.00	7.08	6.86	6.85	7.08	7.27	7.31	7.13	7.19	7.07	7.11	7.08	7.04
15	Chic Burl & Quincy 1st M 8s 1883	9.66	9.74	9.82	9.79	9.74	9.84	9.80	9.56	9.22	9.34	9.45	9.52	9.60

YIELDS OF RAILROAD BONDS

JAN. 1860—JAN. 1861

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
1	Hudson River RR 1st M 7s 1869	6.58	6.67	6.65	6.82	6.48	6.34	6.35	6.12	6.20	6.27	6.69	7.19	6.71
2	Chicago & Rock Is RR 1st M 7s 1870	8.30	8.04	8.33	8.28	7.97	7.61	7.38	7.39	7.62	7.36	7.36	8.43	8.71
3	Lehigh Coal & Nav Co gen M 6s 1870	6.09	6.05	6.13	6.09	6.08	6.18	6.01	6.08	6.01	5.91	6.08	6.32	6.10
4	Phila & Reading RR 2nd M 6s 1870	9.50	9.44	8.88	8.82	8.89	8.54	8.68	8.68	8.38	8.52	8.85	9.45	9.08
5	New York & Harlem RR 1st M 7s 1873	7.97	7.93	7.86	7.55	7.28	7.19	7.23	7.42	7.59	7.55	7.90	8.09	7.50
6	Lehigh Valley RR 1st M 6s 1873	7.59	7.43	7.24	7.13	7.04	6.80	6.73	6.76	6.77	6.75	7.27	7.66	7.38
7	Morris Canal & B Co 1st M 6s 1876	7.35	7.25	7.10	6.97	6.93	6.96	6.69	6.25	6.77	6.76	7.16	7.47	7.28
8	Eastern RR (Mass) 6s 1874	6.26	6.31	6.31	6.26	6.00	5.89	5.73	5.68	5.81	5.86	5.88	6.21	6.00
9	Pennsylvania RR 2nd M 6s 1875	7.67	7.66	7.42	7.42	7.27	7.26	7.36	7.22	7.10	7.20	7.39	7.78	7.72
10	Pennsylvania RR 1st M 6s 1880	6.05	6.06	6.05	6.02	6.08	6.07	6.01	5.92	5.93	5.90	6.19	6.34	6.02
11	Camden & Amboy 6s Jan 1889	7.63	7.51	7.46	7.39	7.27	7.16	7.19	7.22	7.24	7.32	7.57	8.10	7.81
12	Camden & Amboy 6s 1883	7.64	7.57	7.44	7.78	7.15	7.19	7.20	7.22	7.27	7.31	7.75	8.00	7.84
13	N Y C RR debt certificates 6s 1883	6.89	6.88	6.83	6.78	6.72	6.57	6.56	6.53	6.40	6.46	6.72	6.82	6.67
14	N Y C RR for debts assumed 7s 1876	7.04	7.02	7.06	7.09	6.89	6.83	6.85	6.83	6.77	6.73	7.08	7.13	7.28
15	Chic Burl & Quincy 1st M 8s 1883	9.60	9.63	9.72	9.12	9.07	8.57	8.33	8.20	8.21	8.43	8.94	9.42	9.06

YIELDS OF RAILROAD BONDS
 JAN. 1861—JAN. 1862

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
2	Chicago & Rock Is RR 1st M 7s 1870.	8.08	7.64	7.19	7.91	8.70	8.28	7.99	8.47	8.50	8.28	8.54	8.23	7.43
3	Lehigh Coal & Nav Co gen M 6s 1870.	6.10	6.01	5.99	5.93	6.17	6.33	6.01	5.93	5.93	6.03	6.10	6.52	6.38
4	Phila & Reading RR 2d M 6s 1870.	9.05	9.19	9.23	8.87	9.26	9.41	9.13	9.19	9.30	9.41	9.26	9.42	8.99
5	New York & Harlem RR 1st M 7s 1873.	7.38	7.49	7.54	7.43	7.81	7.72	7.32	7.37	7.47	7.51	7.26	7.19	6.91
6	Lehigh Valley RR 1st M 6s 1873.	7.38	7.49	7.54	7.43	7.81	7.72	7.32	7.37	7.47	7.51	7.26	7.19	6.91
7	Morris Canal & B Co 1st M 6s 1876.	7.28	7.25	7.15	7.27	7.54	7.42	7.18	7.26	7.17	7.21	7.06	7.05	6.89
8	Eastern RR (Mass) 6s 1874.	6.00	6.15	6.00	5.83	6.00	6.00	5.83	6.00	6.00	6.00	6.11	6.22	6.22
9	Pennsylvania RR 1st M 6s 1875.	6.02	6.06	6.12	6.18	6.35	6.44	6.47	6.51	6.73	6.68	6.52	6.62	6.14
10	Pennsylvania RR 2d M 6s 1875.	7.81	7.84	7.73	7.74	8.40	8.20	7.97	7.93	7.85	8.01	8.04	8.03	7.73
11	Camden & Amboy 6s Jan 1889.	7.81	7.84	7.73	7.74	8.40	8.20	7.97	7.93	7.85	8.01	8.04	8.03	7.73
12	Camden & Amboy 6s 1883.	7.84	7.91	7.65	7.91	8.64	8.39	7.91	7.88	7.87	8.10	7.84	7.93	7.99
13	N Y C RR debt certificates 6s 1883.	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58	6.58
14	Chic Burl & Quincy 1st M 8s 1883.	9.06	8.79	9.16	8.68	8.99	9.14	8.59	8.93	9.00	9.00	9.06	9.00	8.56
15	Hudson River RR 2d M 7s 1885.	7.25	7.13	7.18	7.21	7.25	7.32	7.35	7.45	7.48	7.59	7.54	7.47	7.06

YIELDS OF RAILROAD BONDS
 JAN. 1862—JAN. 1863

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
5	New York & Harlem RR 1st M 7s 1873.	7.12	7.20	7.35	7.17	6.88	6.69	6.64	6.54	6.41	6.23	6.04	5.78	5.95
6	Lehigh Valley RR 1st M 6s 1873.	6.91	6.42	6.38	6.48	6.17	6.10	6.05	5.83	5.84	5.84	5.78	5.18	4.87
7	Morris Canal & B Co 1st M 6s 1876.	6.89	6.50	6.63	6.57	6.39	6.26	6.27	6.14	5.97	5.73	5.57	5.07	5.03
8	Eastern RR (Mass) 6s 1874.	6.22	5.88	5.93	6.00	5.93	5.65	5.39	5.58	5.31	5.09	4.76	5.07	4.86
9	Pennsylvania RR 2d M 6s 1875.	7.64	7.19	7.09	6.87	6.43	6.32	6.38	6.26	5.99	5.53	5.49	5.39	5.07
10	Pennsylvania RR 1st M 6s 1880.	6.14	6.06	6.18	6.10	5.90	5.75	5.80	5.72	5.47	5.12	5.22	5.36	4.84
11	Camden & Amboy 6s Jan 1889.	7.73	7.33	7.39	7.29	6.70	6.47	6.71	6.74	6.58	6.08	5.83	6.02	5.62
12	Camden & Amboy 6s 1883.	7.99	7.55	7.49	7.24	6.77	6.61	6.88	6.75	6.33	6.00	5.77	6.06	5.79
13	N Y C RR debt certificates 6s 1883.	6.69	6.44	6.55	6.56	6.22	6.02	5.99	5.86	5.35	5.74	5.83	5.68	4.93
14	N Y C RR for debts assumed 7s 1876.	6.57	6.47	6.17	6.81	6.58	6.44	6.40	5.96	5.84	5.74	5.83	5.68	4.93
15	Chic Burl & Quincy 1st M 8s 1883.	8.56	8.20	8.25	8.48	8.01	7.56	7.42	7.27	6.93	6.70	6.80	6.68	6.01
16	Hudson River RR 2d M 7s 1885.	7.06	6.95	7.20	7.21	6.94	6.77	6.79	6.58	6.64	6.57	6.16	6.06	5.41
17	Chic & Nor West Ry 1st M sf 7s 1885.	8.72	8.29	8.30	8.41	7.80	7.54	7.91	7.54	7.26	7.04	7.00	7.06	6.51
18	Philadelphia & Erie 1st M 6s 1881.	8.02	7.97	7.84	7.63	6.90	6.84	6.87	6.50	6.36	5.94	5.81	5.80	5.32
19	Gal & Chi U RR 1st M 7s 1882.	7.21	7.00	7.10	7.13	6.96	6.93	6.81	6.65	6.63	6.32	6.32	6.11	5.36
20	Mich So & Nor Indiana 1st M 7s 1885.	8.79	8.38	8.17	8.10	7.55	7.13	7.16	7.07	6.82	6.64	6.79	6.79	6.31
21	Cleveland & Toledo 1st M 7s 1885.	8.95	8.57	8.53	8.49	7.84	7.53	7.81	7.66	7.13	6.87	6.92	6.82	6.20

YIELDS OF RAILROAD BONDS

JAN. 1863-JAN. 1864

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
5	New York & Harlem RR 1st M 7s 1873.	5.17	4.96	5.28	5.75	5.54	5.38	5.38	5.70	5.70	5.74	5.84	5.88	6.01
6	Lehigh Valley RR 1st M 6s 1873.	4.87	4.41	4.57	4.86	4.93	4.99	5.00	5.04	4.99	4.90	5.16	5.35	5.54
7	Morris Canal & B Co 1st M 6s 1876.	5.03	4.98	5.02	5.32	5.28	5.32	5.22	5.15	5.35	5.41	5.52	5.60	5.68
8	Eastern RR (Mass) 6s 1874.	4.86	4.69	4.63	4.73	4.53	4.72	4.71	5.15	4.97	5.06	5.32	5.35	5.61
9	Pennsylvania RR 2nd M 6s 1875.	5.07	4.65	4.70	5.09	5.17	5.17	5.27	5.50	5.56	5.35	5.35	5.44	5.49
10	Pennsylvania RR 1st M 6s 1880.	4.84	4.58	4.72	4.91	4.91	5.02	5.06	5.26	5.13	5.13	5.32	5.32	5.36
11	Camden & Amboy 6s Jan 1889.	5.62	5.63	5.70	5.87	5.81	5.69	5.75	5.67	5.72	5.76	5.78	5.85	5.98
12	Camden & Amboy 6s 1883.	5.79	5.60	5.61	5.83	5.70	5.74	5.81	5.60	5.80	5.76	5.89	5.96	5.96
13	N Y C RR debt certificates 6s 1883.	5.00	4.71	5.14	5.25	5.22	5.40	5.62	5.58	5.64	5.43	5.47	5.60	5.67
14	N Y C RR for debts assumed 7s 1876.	4.93	4.71	4.91	5.17	5.04	5.55	5.56	5.31	5.46	5.40	5.27	5.56	5.41
15	Chic Burl & Quincy 1st M 8s 1883.	6.01	5.55	5.70	6.01	6.45	6.35	6.29	6.25	6.13	6.14	6.31	6.22	6.37
16	Hudson River RR 2d M 7s 1885.	5.41	5.34	5.51	5.69	5.88	5.65	5.45	5.56	5.60	5.64	5.61	5.66	5.80
17	Chic & Nor West Ry 1st M sf 7s 1885.	6.51	6.47	6.21	6.55	6.66	6.67	6.78	6.92	6.82	6.68	6.92	6.88	6.94
18	Philadelphia & Erie 1st M 6s 1881.	5.52	5.35	5.33	5.62	5.50	5.59	5.75	5.76	5.79	5.62	5.67	5.86	5.89
19	Gal & Chi U RR 1st M 7s 1882.	5.56	5.65	5.74	5.72	5.93	6.04	6.19	6.02	5.88	5.82	5.95	6.05	6.20
20	Mich So & Nor Indiana 1st M 7s 1885.	6.31	6.11	6.20	6.20	6.12	6.25	6.49	6.37	6.22	6.14	6.24	6.33	6.44
21	Cleveland & Toledo 1st M 7s 1885.	6.20	6.12	6.23	6.36	6.18	6.32	6.47	6.17	6.06	6.07	6.17	6.34	6.37
22	Conn & Pass Rivers RR 1st M 6s 1876.	5.42	5.48	5.47	5.76	5.85	5.82	5.81	5.81	5.85	5.88	5.86	5.92	5.97
23	Buffalo NY & Erie 1st M 7s 1877.	6.62	6.26	6.10	6.32	6.09	6.22	6.12	6.40	6.31	5.90	6.37	6.63	6.67
24	Chicago & Alton 1st M 7s 1893.	6.63	6.34	6.29	6.51	6.56	6.62	6.71	6.83	6.88	6.85	6.89	6.95	7.27
25	Pitts Ft Wayne & Chic 1st M 7s 1912.	6.15	5.94	6.00	6.58	6.43	6.65	6.69	6.58	6.62	6.45	6.53	6.69	6.64

YIELDS OF RAILROAD BONDS
JAN. 1864—JAN. 1865

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
5	New York & Harlem RR 1st M 7s 1873.....	6.01	6.06	5.79	5.26	5.43	5.59	4.66	4.85	5.53	6.27	5.75	6.37	6.60
6	Lehigh Valley RR 1st M 6s 1873.....	5.54	5.57	5.28	4.55	4.67	4.72	4.56	4.95	5.56	5.44	5.46	6.03	6.08
7	Morris Canal & B Co 1st M 6s 1876.....	5.68	5.67	5.67	5.34	5.07	5.12	4.49	4.63	5.04	5.50	5.49	5.78	5.78
8	Eastern RR (Mass) 6s 1874.....	5.61	5.78	5.54	5.33	5.37	5.32	5.26	5.12	5.11	5.32	5.65	5.68	5.50
9	Pennsylvania RR 2nd M 6s 1875.....	5.49	5.31	5.00	4.62	4.70	4.56	3.86	4.00	4.76	5.16	5.11	5.25	5.56
10	Pennsylvania RR 1st M 6s 1880.....	5.36	5.16	5.01	4.89	4.80	4.63	4.04	4.05	4.15	5.04	5.01	5.16	5.43
11	Camden & Amboy 6s Jan 1889.....	5.98	6.05	5.92	5.56	5.60	5.53	5.48	5.45	5.67	6.08	6.00	6.01	6.09
12	Camden & Amboy 6s 1883.....	5.96	5.97	5.91	5.55	5.54	5.72	5.53	5.39	5.69	6.07	6.02	6.17	6.19
13	N Y C RR debt certificates 6s 1883.....	5.67	5.58	5.47	5.33	5.17	5.01	4.58	4.55	4.90	5.17	5.25	5.46	5.80
14	N Y C RR for debts assumed 7s 1876.....	5.41	5.52	5.40	5.21	5.22	4.87	4.13	3.76	3.92	4.91	5.37	5.24	5.46
15	Chic Burl & Quincy 1st M 8s 1883.....	6.37	6.28	6.00	5.85	5.85	5.55	5.43	5.25	6.12	6.34	6.10	6.32	6.82
16	Hudson River RR 2d M 7s 1885.....	5.80	5.74	5.77	5.56	5.41	5.29	4.75	4.70	5.42	5.62	5.80	5.86	6.47
17	Chic & Nor West Ry 1st M sf 7s 1885.....	6.94	6.87	6.72	6.34	6.32	6.26	5.61	6.11	6.23	6.68	6.54	6.70	6.88
18	Philadelphia & Erie 1st M 6s 1881.....	5.89	5.75	5.57	5.25	5.40	5.31	5.04	5.29	5.22	5.91	5.56	5.91	6.03
19	Gal & Chi U RR 1st M 7s 1882.....	6.20	5.95	5.72	5.60	5.73	5.29	5.78	4.77	5.29	5.70	5.62	5.84	6.45
20	Mich So & Nor Indiana 1st M 7s 1885.....	6.44	6.26	6.16	6.10	6.07	5.81	5.58	5.80	6.07	6.62	6.35	6.53	7.14
21	Cleveland & Toledo M 7s 1885.....	5.97	5.91	5.97	5.72	5.84	5.76	5.85	5.81	5.95	6.54	6.34	6.60	6.58
22	Cleveland & Toledo M 7s 1885.....	5.97	5.91	5.97	5.72	5.84	5.76	5.85	5.81	5.95	6.54	6.34	6.60	6.58
23	Buffalo & Erie 1st M 7s 1876.....	6.27	6.79	6.24	6.20	6.13	5.33	5.31	5.24	5.97	6.50	6.00	6.03	6.48
24	Buffalo N Y & Erie 1st M 7s 1877.....	7.27	6.93	6.50	6.44	6.42	6.28	5.88	5.38	6.54	6.92	6.73	6.74	6.78
25	Chicago & Alton 1st M 7s 1893.....	7.27	6.93	6.50	6.44	6.42	6.28	5.88	5.38	6.54	6.92	6.73	6.74	6.78
26	Pitts Ft Wayne & Chic 1st M 7s 1912.....	6.64	6.75	6.38	6.12	6.08	5.90	5.35	5.35	5.88	6.42	6.21	6.32	6.45
26	Camden & Amboy M 6s Nov 1889.....	5.65	5.67	5.56	5.23	5.24	5.20	5.01	4.92	5.42	5.70	5.50	5.37	5.64

RAILROAD BOND YIELDS

A39

YIELDS OF RAILROAD BONDS
JAN. 1865—JAN. 1866

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
8	Eastern RR (Mass) 6s 1874.....	5.50	5.86	6.07	6.03	6.04	6.04	6.00	6.45	6.82	7.03	7.22	6.82	6.84
9	Pennsylvania RR 2nd M 6s 1875.....	5.56	5.84	6.07	6.35	6.35	6.35	6.42	6.11	6.18	6.58	6.92	7.00	7.44
10	Pennsylvania RR 1st M 6s 1880.....	5.43	5.43	5.74	6.00	5.94	5.94	5.90	5.73	5.68	5.98	6.11	7.07	7.50
11	Camden & Amboy 6s Jan 1889.....	6.06	6.41	6.73	7.17	7.21	7.21	7.39	7.18	7.19	7.14	7.19	7.44	7.90
12	Camden & Amboy 6s 1883.....	6.19	6.50	6.75	7.17	7.21	7.21	7.39	7.18	7.19	7.14	7.19	7.44	7.90
13	N Y C RR debt certificates 6s 1883.....	5.80	5.94	6.18	6.53	6.46	6.46	6.89	6.71	6.82	6.90	6.90	6.98	6.88
14	N Y C RR for debts assumed 7s 1876.....	5.46	6.05	7.14	7.02	6.65	6.81	6.63	6.71	6.85	7.05	7.06	7.14	7.01
15	Chic Burl & Quincy 1st M 8s 1883.....	6.47	6.46	7.09	6.94	7.08	7.24	7.01	7.13	7.03	6.95	7.07	7.01	7.00
16	Hudson River RR 2d M 7s 1885.....	6.82	6.48	7.38	7.00	7.00	7.00	7.11	7.08	7.03	6.95	7.07	7.01	7.00
17	Chic & Nor West Ky 1st M 8s 1885.....	6.88	6.48	7.38	7.00	7.00	7.00	7.11	7.08	7.03	6.95	7.07	7.01	7.00
18	Phila & Erie 1st M 6s 1881.....	6.03	6.33	6.54	6.18	6.36	6.60	8.01	7.59	7.78	7.95	8.03	8.21	8.21
19	Gal & Chi U R R 1st M 7s 1882.....	6.45	6.09	7.63	7.45	7.27	7.28	7.02	6.99	6.86	6.87	7.01	7.54	7.55
20	Mich So & Nor Indiana 1st M 7s 1885.....	7.14	6.84	6.97	7.16	7.16	7.17	7.47	7.55	7.57	7.56	7.56	8.07	7.64
21	Cleveland & Toledo 1st M 7s 1885.....	6.58	6.72	7.38	6.49	6.12	6.31	7.41	7.33	7.42	7.30	7.31	7.32	7.48
22	Conn & Pass Rivers RR 1st M 6s 1876.....	6.48	6.46	6.49	6.19	6.12	6.31	6.31	7.12	7.30	7.31	7.32	7.32	7.48
23	Buffalo NY & Erie 1st M 7s 1877.....	6.42	7.12	7.37	7.37	7.37	7.37	8.20	8.02	8.10	7.91	7.96	7.94	7.92
24	Chicago & Alton 1st M 7s 1892.....	6.78	6.75	7.16	7.26	7.35	7.55	7.24	7.47	7.52	7.44	7.63	7.59	7.60
25	Pitts Fr Wayne & Chic 1st M 7s 1912.....	9.45	9.44	7.80	7.00	7.03	7.17	6.93	6.87	6.82	6.90	7.01	7.05	7.00
26	Camden & Amboy M 6s Nov 1889.....	5.64	5.76	6.18	6.23	6.04	6.12	6.20	6.23	6.21	6.50	6.50	6.70	6.90

YIELDS OF RAILROAD BONDS
JAN. 1866—JAN. 1867

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
9	Pennsylvania RR 2nd M 6s 1875.....	7.44	7.56	7.44	7.03	6.72	6.97	6.96	6.70	6.62	6.59	6.54	6.57	6.73
10	Pennsylvania RR 1st M 6s 1880.....	6.51	6.65	6.58	6.16	6.16	6.08	6.33	6.11	6.11	5.98	5.99	6.01	6.07
11	Camden & Amboy 6s Jan 1889.....	7.59	7.57	7.63	7.46	7.46	7.46	7.57	7.46	7.46	7.46	7.46	7.46	7.46
12	Camden & Amboy 6s 1883.....	6.88	6.91	7.03	7.26	6.78	6.81	6.57	6.78	6.68	6.71	6.61	7.06	6.78
13	N Y C RR debt certificates 6s 1883.....	7.01	7.00	7.02	7.01	7.07	7.06	7.06	6.93	6.89	6.84	6.37	6.58	7.03
14	N Y C RR for debts assumed 7s 1876.....	7.10	7.10	7.21	7.38	7.05	7.49	7.20	7.04	7.05	7.05	6.79	7.05	6.78
15	Chic Burl & Quincy 1st M 8s 1883.....	6.96	7.06	7.43	6.36	6.36	6.36	6.36	6.36	6.36	6.36	6.36	6.36	6.36
16	Hudson River RR 2d M 7s 1885.....	7.55	7.34	7.16	7.15	7.02	7.18	7.19	7.21	7.10	7.00	6.92	6.99	7.10
17	Chic & Nor West Ky 1st M 8s 1885.....	7.55	7.34	7.16	7.15	7.02	7.18	7.19	7.21	7.10	7.00	6.92	6.99	7.10
18	Philadelphia & Erie 1st M 6s 1881.....	7.45	7.33	7.49	7.48	7.49	7.74	7.74	7.22	7.07	7.16	7.16	7.29	7.36
19	Gal & Chi U R R 1st M 7s 1882.....	7.64	7.82	7.83	7.83	7.81	7.09	7.52	7.56	7.01	7.36	7.33	7.39	7.39
20	Mich So & Nor Indiana 1st M 7s 1885.....	7.58	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68
21	Cleveland & Toledo 1st M 7s 1885.....	7.58	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68	7.68
22	Buffalo NY & Erie 1st M 7s 1877.....	7.64	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63
23	Chicago & Alton 1st M 7s 1892.....	7.64	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63	7.63
24	Pitts Fr Wayne & Chic 1st M 7s 1912.....	7.00	7.14	7.22	7.25	7.09	7.11	6.91	6.92	6.92	7.10	6.85	7.03	6.95
25	Camden & Amboy M 6s Nov 1889.....	6.90	6.99	6.81	6.71	6.71	6.62	6.68	6.56	6.42	6.38	6.36	6.49	6.53
26	Tol & Wabash 1st M 7s 1890.....	8.15	8.21	8.41	8.24	8.18	8.29	8.16	8.29	8.16	8.29	8.16	8.29	8.16
27	St L Alton & T H RR 1st M 7s 1894.....	7.71	7.78	8.01	8.08	8.18	8.13	7.92	7.91	7.91	7.90	7.92	7.87	7.87

YIELDS OF RAILROAD BONDS

JAN. 1867—JAN. 1868

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
10	Pennsylvania R.R. 1st M 6s 1880.....	6.07	6.10	6.17	6.27	6.32	6.38	6.25	6.17	6.17	6.25	6.31	6.23	6.15
11	Candlen & Amboy 6s Jan 1889.....	6.93	7.11	7.16	7.11	7.23	7.37	7.38	7.13	7.34	7.53	7.62	7.60	7.27
12	Candlen & Amboy 6s 1883.....	7.12	7.27	7.22	7.34	7.40	7.37	7.26	7.24	7.28	7.59	7.69	7.69	7.37
13	N Y C R.R. debt certificates 6s 1883.....	6.83	6.66	6.66	6.63	6.66	6.68	6.68	6.65	6.67	6.85	6.85	6.85	7.03
14	N Y C R.R. for debts assumed 7s 1876.....	7.03	6.83	6.66	6.63	6.72	6.80	6.45	6.55	6.67	6.88	6.85	7.10	7.03
15	Chic Burl & Quincy 1st M 8s 1883.....	6.88	6.94	7.01	7.03	7.15	7.19	6.67	6.67	6.93	7.04	7.06	7.20	7.03
16	Hudson River R.R. 2d M 7s 1885.....	6.77	6.87	6.90	6.99	6.87	6.86	6.76	6.68	6.68	6.79	6.89	6.93	6.86
17	Phic & West Ry 1st M 6s 1883.....	7.03	7.24	7.23	7.20	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24
18	Phic & West Ry 2d M 6s 1881.....	7.03	7.24	7.23	7.20	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24	7.24
19	Gal & Chi U R.R. 1st M 7s 1882.....	7.36	7.54	7.27	7.16	7.23	7.27	7.08	7.03	6.96	7.04	7.10	7.20	7.19
20	Mich So & Nor Indiana 1st M 7s 1885.....	7.59	7.47	7.33	7.38	7.38	7.34	7.25	7.28	7.24	7.33	7.37	7.49	7.37
21	Cleveland & Toledo 1st M 7s 1885.....	7.72	7.04	7.00	7.00	7.06	7.02	7.02	6.98	6.98	7.01	7.01	7.01	7.01
22	Chicago & Alton 1st M 7s 1883.....	7.15	7.16	7.15	7.22	7.21	7.19	7.04	6.98	6.94	6.94	6.97	7.04	7.02
23	Pitts Ft Wayne & Chic 1st M 7s 1912.....	6.95	7.03	7.01	7.03	7.03	7.03	6.83	6.74	6.75	6.79	6.81	6.84	6.83
24	Candlen & Amboy M 6s Nov 1889.....	6.55	6.58	6.57	6.52	6.54	6.63	6.54	6.52	6.55	6.54	6.67	6.69	6.49
25	Stol & Raleigh R.R. 1st M 7s 1884.....	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20
26	Stol & Raleigh R.R. 2d M 7s 1894.....	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20	7.20
27	N Y Central renewal bonds 6s 1887.....	6.63	6.66	6.64	6.68	6.68	6.52	6.68	6.68	6.73	6.69	6.84	6.87	6.83
28	N Y Central renewal bonds 6s 1887.....	6.63	6.66	6.64	6.68	6.68	6.52	6.68	6.68	6.73	6.69	6.84	6.87	6.83
29	Morris & Essex 1st M 5s 7s 1914.....	7.42	7.42	7.50	7.47	7.50	7.48	7.48	7.38	7.38	7.36	7.42	7.41	7.32

YIELDS OF RAILROAD BONDS

JAN. 1868-JAN. 1869

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
10	Pennsylvania RR 1st M 6s 1890.....	6.15	6.08	6.02	6.03	5.95	5.95	6.03	6.08	6.12	6.17	6.14	6.24	6.22
11	Cumulative Ambloy 6s 1889.....	7.27	7.17	7.30	7.37	7.18	7.18	7.16	7.23	7.37	7.36	7.40	7.47	7.50
12	Cumulative Ambloy 6s 1889.....	7.37	7.27	7.33	7.37	7.27	7.19	7.19	7.34	7.47	7.47	7.46	7.62	7.48
13	N Y C R R debt certificates 6s 1883.....	6.97	6.87	6.77	6.61	6.64	6.67	6.56	6.58	6.77	6.85	6.68	7.08	7.20
15	Chic Burl & Quincy 1st M 8s 1883.....	7.03	6.85	6.70	6.63	6.85	6.92	6.96	6.80	6.94	6.93	7.02	7.07	7.80
16	Hudson River RR 2d M 7s 1885.....	6.86	6.83	6.73	6.68	6.75	6.98	6.77	6.62	6.75	6.75	6.69	6.68	6.61
17	Chic & Nor West Ry 1st M 7s 1885.....	7.54	7.61	7.62	7.64	7.58	7.45	7.50	7.53	7.50	7.50	7.57	7.60	7.60
18	Gulf & Ohio RR 1st M 8s 1881.....	7.16	7.15	7.08	7.11	7.02	7.29	7.32	6.97	7.07	7.06	7.18	7.32	7.04
20	Mich So & Nor Indiana 1st M 7s 1885.....	7.37	7.23	7.11	7.17	7.14	7.01	7.00	7.13	7.22	7.25	7.35	7.38	7.57
21	Cleveland & Toledo 1st M 7s 1885.....	6.97	6.89	6.95	6.97	6.93	6.93	6.91	6.99	7.13	7.16	6.96	7.04	7.06
23	Buffalo N Y & Erie 1st M 7s 1877.....	8.37	8.16	8.14	8.04	7.93	7.96	7.90	8.01	8.18	8.75	8.99	8.97	8.94
24	Chicago & Alton 1st M 7s 1893.....	7.02	6.93	6.87	7.00	6.85	6.73	6.73	7.08	7.04	7.07	7.17	7.04	7.04
25	Pitts Ft Wayne & Chic 1st M 7s 1912.....	6.88	6.83	6.71	6.74	6.83	6.77	6.75	6.81	6.75	6.71	6.95	7.00	7.04
26	Cumulative Ambloy M 6s Nov 1889.....	6.49	6.39	6.46	6.46	6.35	6.37	6.44	6.37	6.44	6.30	6.73	6.70	6.77
27	Tol & Wabash 1st M 7s 1890.....	8.08	7.94	9.01	7.95	7.85	7.62	7.84	7.85	7.90	8.00	7.90	7.99	7.89
28	St L Alton & T H Ry 1st M 7s 1894.....	6.60	6.58	6.73	6.63	6.77	6.66	6.73	6.57	6.64	6.70	6.87	7.78	7.73
29	N V Central refund bonds 6s 1887.....	6.83	6.73	6.74	6.74	6.69	6.60	6.59	6.46	6.56	6.75	6.82	6.95	7.00
30	Morris & Essex 1st M 7s 1914.....	7.32	7.33	7.29	7.29	7.13	7.11	7.08	7.07	7.15	7.22	7.31	7.30	7.38
31	N Y & Erie RR 1st M 7s 1897.....	6.90	6.81	6.81	6.86	6.82	6.81	6.81	6.84	6.81	6.81	6.81	6.96	6.93

YIELDS OF RAILROAD BONDS

JAN. 1869—JAN. 1870

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
10	Pennsylvania RR 1st M 6s 1880.....	6.22	6.32	6.28	6.34	6.17	6.23	6.31	6.25	6.32	6.51	6.61	6.61	6.39
11	Camden & Amboy 6s Jan 1880.....	7.50	7.53	7.60	7.58	7.47	7.44	7.48	7.50	7.77	7.87	7.77	7.78	7.86
12	Camden & Amboy 6s 1883.....	7.66	7.48	7.81	7.85	7.75	7.61	7.69	7.78	7.85	8.11	8.19	8.29	8.14
13	N Y C RR debt certificates 6s 1883.....	7.20	7.16	7.21	7.31	7.10	7.00	7.06	7.16	7.35	7.43	7.48	7.85	7.55
15	Chic Burl & Quincy 1st M 8s 1883.....	6.84	6.80	6.92	7.01	6.95	7.01	7.09	7.15	7.26	7.33	7.40	7.05	7.07
16	Hudson River RR 2d M 7s 1885.....	6.61	7.00	6.94	6.99	6.93	7.08	7.03	6.86	6.95	6.94	7.00	7.19	6.80
17	Chic & Nor West Ry 1st M sf 7s 1885.....	7.69	7.68	7.63	7.59	7.54	7.67	7.85	7.47	7.72	8.02	7.90	7.62	7.93
18	Philadelphia & Erie 1st M 6s 1881.....	8.04	8.01	8.05	7.98	7.65	7.72	7.80	7.67	7.60	7.82	7.84	7.92	7.90
19	Gal & Chi U RR 1st M 7s 1882.....	7.31	7.31	7.36	7.52	7.50	7.32	7.46	7.48	7.37	7.51	7.29	7.53	7.50
20	Mich So & Nor Indiana 1st M 7s 1885.....	7.57	7.57	7.69	7.45	7.27	7.23	7.33	7.38	7.45	7.57	7.62	7.57	7.48
21	Cleveland & Toledo 1st M 7s 1885.....	7.06	7.17	7.19	7.32	7.29	7.22	7.24	7.15	7.22	7.47	7.62	7.83	7.82
24	Chicago & Alton 1st M 7s 1893.....	7.04	6.99	7.02	7.06	7.06	6.91	7.05	7.07	7.15	7.12	7.21	7.29	7.25
25	Pitts Ft Wayne & Chic 1st M 7s 1912.....	7.74	6.99	6.92	6.98	6.88	6.87	6.93	6.95	7.03	7.20	7.20	7.17	6.89
26	Camden & Amboy M 6s Nov 1889.....	7.74	6.77	6.83	6.78	6.69	6.67	6.71	6.68	6.71	6.64	6.57	6.68	6.78
27	Tol & Wabash 1st M 7s 1890.....	7.89	7.83	8.01	7.99	7.99	8.07	8.21	8.12	8.20	8.30	8.41	8.48	8.29
28	St L Alton & T H RR 1st M 7s 1894.....	7.73	7.71	7.73	7.77	7.85	7.74	7.71	7.86	7.73	7.88	8.00	7.98	7.76
29	N Y Central renewal bonds 6s 1887.....	7.00	7.06	7.06	7.14	6.94	6.88	6.99	6.89	7.08	7.13	7.24	7.70	7.37
30	Morris & Essex 1st M sf 7s 1914.....	7.38	7.36	7.28	7.25	7.15	7.11	7.19	7.25	7.27	7.28	7.34	7.38	7.24
31	N Y & Erie RR 1st M 7s 1897.....	6.93	7.09	7.07	7.27	7.02	7.17	7.32	7.35	7.39	7.54	7.46	7.44	7.71
32	M & St P (P du Ch dv) 1st M 8s 1898.....	7.93	7.76	7.87	7.92	7.85	7.86	7.88	7.92	8.05	8.13	8.16	8.05	7.93
33	Lehigh Valley RR 1st M 6s 1898.....	6.54	6.58	6.64	6.66	6.62	6.52	6.52	6.56	6.63	6.66	6.72	6.67	6.58

YIELDS OF RAILROAD BONDS

JAN. 1870—JAN. 1871

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
11	Camden & Amboy 6s Jan 1839.....	7.86	7.67	7.44	7.37	7.18	6.87	7.04	6.88	7.01	6.96	6.99	6.91	6.69
12	Camden & Amboy 6s 1883.....	8.14	7.89	7.69	7.63	7.37	7.17	7.06	7.25	7.37	7.01	7.01	7.01	6.93
13	N Y C R R debt certificates 6s 1883.....	7.35	7.42	7.27	7.15	7.16	6.95	6.87	7.25	7.34	7.01	7.01	7.01	7.06
15	Chic Burl & Quincy 1st M 8s 1883.....	7.07	6.86	6.79	6.72	6.68	6.76	6.76	6.83	6.85	6.98	6.88	6.83	6.84
16	Hudson River RR 2d M 7s 1883.....	6.80	6.65	6.64	6.72	6.75	6.71	7.06	6.97	6.76	6.75	6.75	6.82	6.76
17	Chic & Nor West Ry 1st M sf 7s 1885.....	7.93	7.39	7.54	7.61	7.48	7.29	7.08	7.42	7.47	7.49	7.52	7.52	7.54
18	Phila & Wm & Merc 6s Jan 1881.....	7.60	7.79	7.42	7.51	7.26	7.24	7.31	7.27	7.19	7.24	7.30	7.39	7.35
19	Gal & Chi U R R 1st M 7s 1881.....	7.30	7.21	7.24	7.38	7.40	7.34	7.03	7.18	7.25	7.26	7.28	7.35	7.43
20	Mich So & Nor Indiana 1st M 7s 1885.....	7.30	7.21	7.24	7.38	7.40	7.34	7.03	7.18	7.25	7.26	7.28	7.35	7.43
21	Cleveland & Toledo 1st M 7s 1883.....	7.82	7.43	6.97	7.11	7.07	6.97	7.06	7.40	7.39	7.22	7.36	7.33	7.08
24	Chicago & Alton 1st M 7s 1893.....	7.25	6.90	6.89	7.03	7.01	6.97	6.96	7.06	6.95	7.00	7.03	7.04	7.09
25	Pitts Ft Wayne & Chic 1st M 7s 1912.....	6.89	6.77	6.69	6.82	6.87	6.85	6.84	6.96	6.93	6.86	6.90	7.02	6.95
26	Camden & Amboy M 6s Nov 1889.....	6.78	6.77	6.76	6.60	6.62	6.58	6.57	6.58	6.65	6.58	6.58	6.58	6.57
27	Toi & Wabash 1st M 7s 1890.....	8.29	8.02	7.72	7.82	7.90	7.90	7.87	7.92	7.89	8.09	8.03	7.84	7.73
28	St L Alton & T H RR 1st M 7s 1894.....	7.76	7.63	7.58	7.67	7.64	7.56	7.64	7.57	7.36	7.53	7.71	7.66	7.48
29	N Y Central renewal bonds 6s 1887.....	7.37	7.20	7.09	7.04	7.02	7.00	7.02	7.15	7.21	7.25	7.29	7.56	7.29
30	Morris & Essex 1st M sf 7s 1914.....	7.24	7.12	7.03	7.05	6.98	6.98	6.92	7.13	7.21	7.25	7.33	7.56	7.03
31	N Y & Erie RR 1st M 7s 1897.....	7.11	7.38	7.18	7.27	7.22	7.16	7.13	7.21	7.26	7.27	7.31	7.51	7.36
32	M & St P (P du Ch dv) 1st M 8s 1898.....	7.03	7.76	7.70	7.71	7.66	7.65	7.62	7.80	7.63	7.73	7.81	7.81	7.79
33	Lehigh Valley RR 1st M 6s 1898.....	6.58	6.48	6.42	6.44	6.35	6.41	6.38	6.33	6.46	6.33	6.33	6.48	6.51
34	Central RR of New Jersey M 7s 1890.....	7.50	7.15	7.17	7.24	7.03	7.01	7.02	6.98	6.99	7.08	7.03	7.03	7.00

YIELDS OF RAILROAD BONDS
JAN. 1871—JAN. 1872

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
11	Camden & Amboy 6s Jan 1839.....	6.69	7.00	6.74	6.87	6.94	7.17	7.16	7.13	7.18	7.24	7.25	7.26	7.14
12	Camden & Amboy 6s 1883.....	6.93	6.98	6.96	6.99	7.13	7.08	7.22	7.36	7.45	7.40	7.50	7.71	7.43
13	N Y C R R debt certificates 6s 1883.....	7.26	7.30	7.13	7.15	7.02	7.07	7.12	7.13	7.09	7.11	7.52	7.71	7.13
14	Chic Burl & Quincy 1st M 8s 1883.....	6.84	6.86	6.90	6.63	6.76	6.70	6.72	6.63	6.64	6.63	6.63	6.45	6.26
15	Chic Burl & Quincy 1st M 8s 1883.....	6.76	6.80	6.95	6.88	6.86	6.75	6.75	6.60	6.60	6.78	6.66	6.47	6.43
16	Hudson River RR 2d M 7s 1885.....	7.54	7.35	7.17	7.33	7.27	7.36	7.25	7.03	7.03	7.12	7.12	7.09	6.96
17	Chic & Nor West Ry 1st M sf 7s 1885.....	7.35	7.16	7.15	7.12	7.30	7.23	7.27	7.36	7.49	7.72	7.88	7.90	7.39
18	Chic & Nor West Ry 1st M sf 7s 1885.....	7.43	7.24	7.20	7.15	7.08	7.12	7.06	7.02	6.61	6.52	6.90	6.68	6.48
19	Gal & Chi U R R 1st M 7s 1882.....	7.28	7.20	7.14	7.04	6.94	6.95	6.94	6.86	6.90	7.15	7.12	6.99	6.77
20	Mich So & Nor Indiana 1st M 7s 1885.....	7.08	7.10	7.05	7.00	7.01	6.98	6.97	6.93	6.89	7.09	7.12	7.05	6.85
21	Cleveland & Toledo 1st M 7s 1885.....	7.09	6.93	7.00	6.86	6.94	6.93	6.80	6.81	6.83	6.64	6.93	6.76	6.65
22	Chicago & Alton 1st M 7s 1893.....	6.57	6.52	6.61	6.63	6.83	6.81	6.88	6.64	6.55	6.79	6.79	6.74	6.68
23	Pitts Ft Wayne & Chic 1st M 7s 1912.....	7.91	7.84	7.86	7.79	7.82	7.72	7.60	6.57	6.52	6.67	6.60	6.66	6.56
24	Camden & Amboy M 6s Nov 1889.....	7.48	7.40	7.46	7.52	7.40	7.16	7.08	7.10	7.18	7.37	7.43	7.37	7.15
25	Col & Wadsworth 1st M 7s 1887.....	7.29	7.07	7.04	7.01	6.87	6.86	6.87	7.02	6.94	6.93	7.09	7.07	6.83
26	St L Alton & T H RR 1st M 7s 1894.....	7.03	6.97	6.96	6.96	6.93	6.83	6.85	6.84	6.79	6.91	7.24	7.07	6.83
27	N Y Central renewal bonds 6s 1887.....	7.43	7.44	7.35	7.30	7.04	7.05	7.05	7.43	7.32	7.60	7.66	7.59	7.41
28	Morris & Essex 1st M sf 7s 1914.....	7.79	7.44	7.69	7.61	6.25	6.39	6.44	6.36	6.31	6.41	6.42	6.46	6.48
29	N Y & Erie RR 1st M 7s 1897.....	6.31	6.52	6.61	6.61	6.25	6.39	6.44	6.36	6.31	6.41	6.42	6.46	6.48
30	N Y & Erie RR 1st M 7s 1897.....	6.31	6.52	6.61	6.61	6.25	6.39	6.44	6.36	6.31	6.41	6.42	6.46	6.48
31	M & St P (P du Ch dv) 1st M 8s 1898.....	7.00	7.00	7.01	7.00	6.99	6.93	6.94	6.86	6.80	6.98	6.93	6.91	6.64
32	Lehigh Valley RR 1st M 6s 1898.....	7.00	7.00	7.01	7.00	6.99	6.93	6.94	6.86	6.80	6.98	6.93	6.91	6.64
33	Central RR of New Jersey M 7s 1890.....	7.00	7.00	7.01	7.00	6.99	6.93	6.94	6.86	6.80	6.98	6.93	6.91	6.64

YIELDS OF RAILROAD BONDS
JAN. 1872—JAN. 1873

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
12	Carden & Amboy 6s 1883.....	7.43	7.21	7.25	7.25	7.35	7.36	7.30	7.26	7.14	7.27	7.26	7.44	7.37
13	Chicago & Alton 1st M 7s 1893.....	6.59	6.44	7.15	7.02	7.09	6.91	6.73	6.90	7.55	7.44	7.41	7.29	7.20
14	Chic Buri & Quincy 1st M 8s 1883.....	6.43	6.39	6.57	6.49	6.59	6.61	6.57	6.58	6.30	6.69	6.74	6.72	6.45
15	Hudson River RR 2d M 7s 1885.....	6.43	6.30	6.57	6.49	6.59	6.61	6.57	6.58	6.30	6.69	6.74	6.72	6.45
16	Hudson River RR 2d M 7s 1885.....	6.43	6.30	6.57	6.49	6.59	6.61	6.57	6.58	6.30	6.69	6.74	6.72	6.45
20	Mich So & Nor Indiana 1st M 7s 1885.....	6.71	6.80	6.81	6.91	6.89	6.84	6.83	6.89	7.08	7.01	6.94	6.94	6.75
21	Cleveland & Toledo 1st M 7s 1885.....	6.85	6.76	7.17	6.95	6.94	6.89	6.87	6.87	6.93	6.95	7.01	7.03	6.96
24	Chicago & Alton 1st M 7s 1893.....	6.65	6.61	6.70	6.71	6.60	6.77	6.77	6.69	6.62	6.78	6.92	6.93	6.88
25	Chicago & Alton 1st M 7s 1893.....	6.65	6.61	6.70	6.71	6.60	6.77	6.77	6.69	6.62	6.78	6.92	6.93	6.88
26	Carden & Amboy 6s Nov 1889.....	6.68	6.68	6.66	6.73	6.79	6.74	6.66	6.71	6.78	6.86	6.91	6.91	6.74
27	Tol & Wabash 1st M 7s 1890.....	7.26	7.17	7.32	7.40	7.46	7.47	7.35	7.34	6.41	6.42	6.50	6.67	6.53
28	St L Alton & T H RR 1st M 7s 1894.....	7.15	7.32	7.42	7.26	7.26	7.25	7.12	7.13	7.14	7.12	7.15	7.23	7.07
29	N Y Central renewal bonds 6s 1887.....	6.83	6.72	6.88	6.88	6.90	6.79	6.64	7.08	6.96	7.02	7.50	7.30	7.00
30	North & Essex 1st M 7s 1914.....	6.77	6.74	6.85	6.80	6.82	6.71	6.61	6.83	6.96	6.87	6.88	6.78	6.79
31	North & Essex 1st M 7s 1898.....	7.01	6.91	6.99	7.01	6.95	6.85	6.85	6.90	6.97	6.95	6.88	6.95	7.01
32	M & St P (P du Ch W) 1st M 8s 1898.....	7.41	7.42	7.44	7.50	7.53	7.54	7.37	7.47	7.62	7.62	7.58	7.64	7.63
33	Lehigh Valley RR 1st M 6s 1893.....	6.48	6.43	6.47	6.46	6.30	6.26	6.18	6.22	6.29	6.37	6.37	6.51	6.48
34	Central RR of New Jersey M 7s 1890.....	6.64	6.62	6.65	6.68	6.73	6.67	6.57	6.66	6.82	6.88	6.96	6.96	6.75
35	Lehigh Coal & Nav Co RR Loan 6s 1897.....	6.60	6.57	6.68	6.71	6.69	6.50	6.43	6.33	6.36	6.50	6.57	6.62	6.73
36	Chicago & Milwaukee RR 1st M 7s 1898.....	7.61	7.59	7.57	7.58	7.66	7.64	7.64	7.78	7.69	7.81	7.84	7.82	7.70
37	Lake Shore Ry Dividend bonds 7s 1899.....	7.66	7.57	7.45	7.48	7.43	7.43	7.46	7.46	7.54	7.67	7.64	7.74	7.76
38	Clev Col Cin & Ind 1st M 7s 1899.....	6.98	7.00	7.06	7.06	7.06	6.99	6.95	6.96	6.99	7.02	7.03	7.04	6.98
39	Lehigh Valley RR 2nd M reg 7s 1910.....	6.99	7.06	6.96	6.92	7.04	6.75	6.74	6.79	6.82	6.83	6.85	6.86	6.86
40	Chic & Nor West Ry cons 7s 1915.....	7.66	7.57	7.52	7.44	7.33	7.31	7.32	7.46	7.61	7.62	7.63	7.82	7.83

YIELDS OF RAILROAD BONDS
JAN. 1873—JAN. 1874

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
16	Hudson River RR 2d M 7s 1885.....	6.74	6.66	6.74	6.74	6.59	6.43	6.52	6.65	6.73	6.95	7.10	7.10	6.85
19	Mich So & Nor Indiana 1st M 7s 1885.....	6.75	6.85	6.78	6.82	6.79	6.67	6.68	6.71	6.72	7.25	7.30	7.13	6.87
21	Cleveland & Toledo 1st M 7s 1885.....	6.96	7.00	7.06	7.00	6.96	6.88	6.90	6.96	6.97	7.23	7.44	7.16	6.90
24	Chicago & Alton 1st M 7s 1893.....	6.88	6.82	6.87	6.84	6.80	6.77	6.70	6.57	6.77	7.10	6.97	6.96	6.74
25	Pitts Ft Wayne & Chic 1st M 7s 1912.....	6.74	6.70	6.76	6.59	6.72	6.69	6.57	6.66	6.69	6.95	7.12	6.98	6.69
26	Camden & Amboy M 6s Nov 1889.....	6.53	6.53	6.57	6.64	6.56	6.56	6.47	6.41	6.74	6.94	6.81	6.92	6.47
27	Tol & Wabash 1st M 7s 1890.....	7.35	7.45	7.56	7.63	7.59	7.59	7.52	7.48	7.35	7.99	8.06	7.91	7.58
28	St L Alton & T H RR 1st M 7s 1894.....	7.07	7.08	7.09	7.19	7.17	7.21	7.11	7.06	7.01	7.83	7.78	7.31	7.25
29	N Y Central renewal bonds 6s 1887.....	7.00	7.02	7.01	6.93	6.93	6.71	6.71	6.71	6.99	7.04	7.01	6.85	6.77
30	Morris & Essex 1st M sf 7s 1914.....	6.79	6.76	6.79	6.83	6.80	6.71	6.77	6.75	6.99	7.04	7.01	6.85	6.77
31	N Y & Erie RR 1st M 7s 1897.....	7.01	6.99	6.95	7.00	6.92	6.89	6.85	6.82	6.85	7.13	7.16	7.08	6.98
32	M & St P (P du Ch dv) 1st M 8s 1898.....	7.63	7.56	7.44	7.53	7.49	7.48	7.46	7.49	7.51	7.88	8.15	7.85	7.56
33	Lehigh Valley RR 1st M 6s 1898.....	6.48	6.49	6.45	6.34	6.36	6.46	6.47	6.57	6.65	6.69	6.69	6.55	6.31
34	Central RR of New Jersey M 7s 1890.....	6.75	6.76	6.78	6.84	6.77	6.62	6.58	6.56	6.58	6.95	7.24	6.86	6.68
35	Lehigh Coal & Nav Co RR Loan 6s 1897.....	6.73	6.62	6.66	6.76	6.75	6.77	6.81	6.77	6.99	7.54	7.13	7.08	6.77
36	Chicago & Milwaukee RR 1st M 7s 1898.....	7.70	7.64	7.69	7.75	7.69	7.65	7.67	7.70	7.78	8.14	8.11	7.90	7.72
37	Lake Shore Ry dividend bonds 7s 1899.....	7.76	7.69	7.64	7.67	7.67	7.66	7.53	7.62	7.66	7.66	8.41	8.06	7.73
38	Clev Col Cin & Ind 1st M sf 7s 1899.....	6.98	6.97	6.99	7.02	6.90	6.85	6.77	6.77	7.07	7.51	7.34	7.07	6.87
39	Lehigh Valley RR 2nd M reg 7s 1910.....	6.86	6.79	6.71	6.78	6.81	6.82	6.86	6.76	6.92	7.46	7.08	6.80	6.93
40	Chic & Nor West Ry cons sf 7s 1915.....	7.83	7.80	7.86	7.94	7.95	7.91	7.76	7.74	7.97	8.53	8.57	8.08	7.95
41	L Sh & Mich So cons 1st M sf 7s 1900.....	7.15	7.17	7.22	7.28	7.34	7.33	7.07	7.12	7.58	8.13	8.21	7.97	7.40

YIELDS OF RAILROAD BONDS
JAN. 1874—JAN. 1875

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
16	Hudson River RR 2d M 7s 1885.....	6.85	6.51	6.62	6.53	6.68	6.58	6.46	6.46	6.54	6.46	6.29	6.37	6.22
20	Mich So & Nor Indiana 1st M 7s 1885.....	6.87	6.80	6.73	6.70	6.78	6.73	6.73	6.84	6.75	6.76	6.57	6.45	6.30
21	Cleveland & Toledo 1st M 7s 1885.....	6.90	6.99	6.87	6.78	6.95	6.90	6.89	6.86	6.86	6.87	6.55	6.43	6.31
24	Chicago & Alton 1st M 7s 1893.....	6.74	6.69	6.66	6.57	6.62	6.64	6.60	6.61	6.66	6.35	6.43	6.58	6.43
25	Pitts Ft Wayne & Chic 1st M 7s 1912.....	6.69	6.66	6.67	6.67	6.79	6.77	6.74	6.72	6.67	6.56	6.46	6.44	6.55
26	Camden & Amboy M 6s Nov 1889.....	6.47	6.40	6.33	6.33	6.18	6.13	6.08	6.12	6.09	6.02	6.03	5.96	5.89
27	Alton & Hannibal RR 1st M 7s 1894.....	7.25	6.83	6.71	6.91	6.50	7.07	6.97	6.77	6.81	6.48	6.62	6.84	6.56
29	St V Centennial bnd 6s 1887.....	7.25	6.83	6.71	6.91	6.50	7.07	6.97	6.77	6.81	6.48	6.62	6.84	6.56
30	Morris & Essex 1st M 7s 1914.....	6.77	6.70	6.72	6.75	6.72	6.70	6.69	6.71	6.67	6.57	6.59	6.29	6.24
31	N Y & Erie RR 1st M 7s 1897.....	6.98	6.92	6.94	6.85	6.85	6.77	6.93	6.85	6.90	6.88	6.80	6.81	6.74
32	M & St P (P du Ch dv) 1st M 8s 1898.....	7.56	7.51	7.47	7.49	7.66	7.67	7.65	7.68	7.70	7.59	7.53	7.54	7.46
33	Lehigh Valley RR 1st M 6s 1898.....	6.31	6.14	6.21	6.14	6.12	6.06	6.06	6.06	6.09	6.11	6.04	5.96	5.90
34	Central RR of New Jersey M 7s 1890.....	6.68	6.57	6.50	6.36	6.34	6.41	6.61	6.61	6.51	6.43	6.37	6.28	6.39
35	Lehigh Coal & Nav Co RR Loan 6s 1897.....	6.77	6.49	6.52	6.58	6.54	6.48	6.42	6.34	6.29	6.29	6.28	6.18	6.22
36	Chicago & Milwaukee RR 1st M 7s 1898.....	7.72	7.63	7.74	7.72	7.74	7.75	7.84	7.78	7.88	7.84	7.85	7.76	7.64
37	Lake Shore Ry dividend bonds 7s 1899.....	7.73	7.54	7.53	7.49	7.54	7.51	7.50	7.47	7.47	7.34	7.23	7.21	7.14
38	Clev Col Cin & Ind 1st M sf 7s 1899.....	7.07	7.00	6.94	7.00	7.07	7.14	7.09	7.04	6.95	6.88	6.72	6.72	6.62
39	Lehigh Valley RR 2nd M rfg 7s 1910.....	6.86	6.92	6.81	6.81	6.79	6.67	6.70	6.81	6.71	6.74	6.72	6.66	6.64
40	Chic & Nor West Ry cons sf 7s 1915.....	7.95	7.63	7.78	7.94	8.12	8.19	8.30	8.38	8.42	8.45	8.18	7.99	7.90
41	L Sh & Mich So cons 1st M sf 7s 1900.....	7.40	7.38	7.38	7.37	7.42	7.45	7.40	7.39	7.26	7.15	6.98	7.06	6.94
42	Pennsylvania RR Co gen M 6s 1910.....	6.84	6.81	6.87	6.86	6.94	6.77	6.69	6.59	6.63	6.68	6.59	6.42	6.31

YIELDS OF RAILROAD BONDS
JAN. 1875—JAN. 1876

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
24	Chicago & Alton 1st M 7s 1893.....	6.43	6.23	6.25	5.97	6.00	6.01	6.11	6.08	6.00	6.04	5.83	5.89	5.88
25	Pitts Ft Wayne & Chic 1st M 7s 1912.....	6.45	6.43	6.42	6.32	6.34	6.30	6.21	6.18	6.17	6.18	6.09	6.14	5.98
26	Samden & Lombard RR 1st M 7s 1890.....	5.89	5.86	5.90	5.86	5.76	5.71	5.73	5.74	5.64	5.61	5.57	5.59	5.58
27	St V Central RR 1st M 7s 1894.....	6.56	6.64	6.65	6.62	6.68	6.77	6.45	6.39	6.42	6.48	6.64	6.51	6.48
29	N Y Central renewal bonds 6s 1887.....	6.24	6.20	6.21	6.12	5.99	5.94	5.89	5.86	5.78	5.99	5.86	5.91	5.74
30	Morris & Essex 1st M sf 7s 1914.....	6.46	6.32	6.34	6.30	6.29	6.29	6.25	6.18	6.06	6.17	6.01	6.04	6.07
31	N Y & Erie RR 1st M 7s 1897.....	6.74	6.77	6.70	6.71	6.71	6.92	6.88	6.86	6.83	6.75	6.71	6.57	6.43
32	M & St P (P du Ch div) 1st M 8s 1898.....	7.46	7.50	7.51	7.39	7.33	7.11	7.20	7.28	7.82	7.55	7.81	7.73	7.72
33	Lehigh Valley RR 1st M 6s 1898.....	5.00	5.85	5.90	5.78	5.88	5.71	5.70	5.28	5.82	5.89	5.83	5.70	5.64
34	Central RR of New Jersey M 7s 1890.....	6.39	6.12	6.09	5.72	6.01	6.02	6.00	5.98	5.93	5.89	5.90	5.70	5.64
35	Lehigh Coal & Nav Co RR Loan 6s 1897.....	6.22	6.07	6.09	6.07	5.96	5.92	5.94	6.00	5.97	6.03	5.94	5.83	5.77
36	Chicago & Milwaukee RR 1st M 7s 1898.....	7.64	7.58	7.56	7.60	7.43	7.39	7.32	7.28	7.27	7.35	7.24	7.02	7.00
37	Lake Shore Ry dividend bonds 7s 1899.....	7.14	7.21	7.08	6.98	6.95	7.12	7.11	7.11	7.08	7.07	7.08	7.00	6.83
38	Clev Col Cin & Ind 1st M sf 7s 1899.....	6.62	6.62	6.63	6.58	6.46	6.56	6.61	6.64	6.56	6.47	6.54	6.58	6.35
39	Lehigh Valley RR 2nd M reg 7s 1910.....	6.64	6.71	6.66	6.46	6.46	6.48	6.47	6.43	6.31	6.38	6.40	6.38	6.31
40	Chic & Nor West Ry cons of 7s 1915.....	7.90	7.94	7.97	7.70	7.58	7.52	7.37	7.24	7.22	7.33	7.31	7.18	7.05
41	U S & Mich St 1st M sf 7s 1900.....	6.94	7.04	6.97	6.93	6.92	7.37	6.96	6.78	6.95	6.97	6.99	6.89	6.79
42	Pennsylvania RR Co gen M 6s 1910.....	6.31	6.13	6.14	6.04	5.99	5.98	5.90	5.99	6.02	6.04	6.01	5.99	5.94
43	New York & Harlem RR cons M 7s 1900.....	6.34	6.34	6.38	6.27	6.23	6.23	6.24	6.13	6.18	6.18	6.09	5.98	5.85
44	N Y C & H R RR 1st M 7s 1903.....	6.11	6.09	6.10	6.10	5.96	5.98	5.87	5.87	5.60	5.68	5.70	5.49	5.32
45	Chic Burl & Quincy RR cons M 7s 1903.....	6.85	6.85	6.81	6.81	6.66	6.60	6.60	6.60	6.61	6.65	6.58	6.45	6.42

YIELDS OF RAILROAD BONDS
JAN. 1876—JAN. 1877

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
24	Chicago & Alton 1st M 7s 1893.....	5.88	5.65	5.63	5.60	5.56	5.47	5.37	5.23	5.31	5.56	5.53	5.54	5.54
25	Pitts Ft Wayne & Chic 1st M 7s 1912.....	5.99	5.99	5.91	5.90	5.86	5.86	5.81	5.65	5.77	5.79	5.77	5.74	5.80
26	Camden & Amboy M 6s Nov 1889.....	5.58	5.58	5.63	5.73	5.67	5.54	5.52	5.44	5.46	5.46	5.32	5.13	5.08
28	St L Alton & T H RR 1st M 7s 1894.....	6.48	6.44	6.42	6.44	6.64	6.27	6.26	6.32	6.44	6.50	6.51	6.54	6.25
29	N Y Central renewal bonds 6s 1887.....	5.74	5.62	5.65	5.65	5.59	5.61	5.44	5.37	5.70	5.55	5.65	5.80	5.54
30	Morris & Essex 1st M 7s 1914.....	6.07	5.97	5.96	5.96	6.01	5.98	5.84	5.78	6.01	6.01	5.94	5.82	6.00
31	N Y & Erie RR 1st M 7s 1897.....	6.43	6.37	6.33	6.11	6.30	6.23	6.20	6.27	6.41	6.04	6.29	6.73	6.74
32	M & St P (P du Ch dv) 1st M 8s 1898.....	6.94	6.79	6.68	6.73	6.79	6.83	6.73	6.60	6.60	6.69	6.60	6.74	6.74
33	Lehigh Valley RR 1st M 6s 1898.....	5.72	5.70	5.65	5.67	5.62	5.52	5.52	5.60	5.58	5.56	5.44	5.37	5.29
34	Central RR of New Jersey M 7s 1890.....	5.64	5.52	5.60	5.87	5.87	6.05	5.70	5.65	6.26	6.18	6.12	6.23	6.46
35	Lehigh Coal & Nav Co RR Loan 6s 1897.....	5.77	5.82	5.81	5.84	5.83	5.84	5.84	5.90	6.02	6.10	5.93	6.02	5.77
36	Chicago & Milwaukee RR 1st M 7s 1898.....	7.00	6.97	6.96	7.10	6.93	6.96	6.82	6.76	6.61	6.67	6.71	6.67	6.59
37	Lake Shore Ry dividend bonds 7s 1899.....	6.83	6.82	6.82	6.68	6.78	6.82	6.88	6.79	6.80	6.64	6.62	6.76	6.61
38	Cleve Col Cin & Ind 1st M st 7s 1899.....	6.35	6.41	6.34	6.33	6.35	6.31	6.33	6.42	6.33	6.37	6.34	6.37	6.36
39	Lehigh Valley RR 2nd M reg 7s 1910.....	6.31	6.32	6.23	6.30	6.40	6.31	6.24	6.34	6.22	6.29	6.17	6.09	6.12
40	Chic & Nor West Ry cons sf 7s 1915.....	7.05	6.92	6.86	6.90	6.90	6.89	6.85	6.71	6.78	6.83	6.88	6.85	6.84
41	L Sh & Mich So cons 1st M st 7s 1900.....	6.79	6.70	6.54	6.55	6.66	6.57	6.47	6.53	6.54	6.54	6.60	6.70	6.59
42	Pennsylvania RR Co gen M 6s 1910.....	5.94	5.82	5.78	5.80	5.78	5.76	5.76	5.65	5.63	5.68	5.69	5.57	5.49
43	New York & Harlem RR cons M 7s 1900.....	5.85	5.75	5.68	5.67	5.74	5.74	5.68	5.56	5.68	5.76	5.65	5.65	5.59
44	N Y C & H R RR 1st M 7s 1903.....	5.52	5.52	5.46	5.62	5.79	5.77	5.50	5.49	5.76	5.73	5.73	5.78	5.70
45	Chic Burt & Quincy RR cons M 7s 1903.....	6.42	6.40	6.35	6.32	6.30	6.29	6.28	6.22	6.24	6.22	6.29	6.28	6.24

YIELDS OF RAILROAD BONDS
JAN. 1877—JAN. 1878

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
24	Chicago & Alton 1st M 7s 1893.	5.54	5.58	5.77	5.80	5.79	5.57	5.39	5.53	5.65	5.75	5.79	5.84	5.70
25	Pitts Ft Wayne & Chic R 1st M 1912.	5.08	5.12	5.27	5.79	5.80	5.79	5.79	5.83	5.87	5.91	5.88	5.85	5.80
26	St Louis & T Ry 1st M 7s 1890.	5.08	5.12	5.27	5.47	5.36	5.23	5.21	5.05	5.01	5.10	5.20	5.13	5.08
28	St Louis & T Ry 1st M 7s 1894.	6.25	6.25	6.36	6.40	6.49	6.23	6.05	6.09	6.17	6.14	6.26	6.26	6.33
30	Morris & Essex 1st M sf 7s 1914.	6.00	6.09	6.09	6.10	6.06	5.93	5.98	6.07	6.04	6.08	6.04	6.00	6.02
31	N Y & Erie RR 1st M 7s 1897.	6.28	6.28	6.08	6.02	5.98	5.90	5.94	5.94	6.05	6.17	6.11	6.05	6.15
32	M & St P (P du Ch dv) 1st M 8s 1898.	6.74	6.74	6.75	6.76	6.55	6.67	6.71	6.71	6.83	6.83	6.75	6.69	6.40
33	Lehigh Valley RR 1st M 6s 1898.	5.29	5.50	5.62	5.64	5.64	5.64	5.91	5.88	5.94	6.00	5.91	5.81	5.78
34	Central RR of New Jersey M 7s 1890.	5.77	5.87	6.13	6.18	6.13	6.13	6.00	5.91	5.81	5.71	5.94	5.96	5.90
35	Lehigh Coal & Nav Co RR Loan 6s 1897.	6.59	6.51	6.61	6.61	6.67	6.46	6.29	6.38	6.45	6.52	6.50	6.45	6.85
36	Chicago & Milwaukee RR 1st M 7s 1898.	6.61	6.58	6.56	6.62	6.56	6.48	6.48	6.52	6.55	6.59	6.52	6.39	6.81
37	Lake Shore Ry dividend bonds 7s 1899.	6.36	6.36	6.36	6.52	6.45	6.21	6.28	6.35	6.41	6.42	6.42	6.30	6.15
38	Clev Col Cin & Ind 1st M sf 7s 1899.	6.12	6.34	6.40	6.38	6.52	6.45	6.31	6.39	6.43	6.43	6.42	6.42	6.41
39	Lehigh Valley RR 2nd M reg 7s 1910.	6.84	6.81	6.75	6.74	6.69	6.63	6.63	6.66	6.63	6.65	6.59	6.57	6.55
40	Chic & Nor West Ry cons sf 7s 1915.	6.59	6.48	6.52	6.64	6.53	6.51	6.37	6.47	6.38	6.41	6.40	6.30	6.24
41	I Sh & Mich So cons 1st M sf 7s 1900.	5.49	5.56	5.67	5.67	5.64	5.66	5.65	5.72	5.66	5.69	5.69	5.65	5.56
42	Pennsylvania R Co RR cons M 7s 1910.	5.59	5.59	5.59	5.63	5.65	5.64	5.71	5.70	5.72	5.81	5.78	5.64	5.55
43	N Y & H R RR cons M 7s 1900.	5.70	5.82	5.92	5.87	5.74	5.70	5.68	5.71	5.78	5.78	5.69	5.70	5.62
44	N Y C & H R RR 1st M 7s 1903.	6.24	6.29	6.50	6.41	6.40	6.38	6.33	6.32	6.37	6.32	6.27	6.24	6.27
45	Chic Burl & Quincy RR cons M 7s 1903.	6.24	6.29	6.50	6.41	6.40	6.38	6.33	6.32	6.37	6.32	6.27	6.24	6.27

YIELDS OF RAILROAD BONDS

JAN. 1878—JAN. 1879

Rel. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
21	Chicago & Alton 1st M 7s 1893.....	5.70	5.66	5.62	5.57	5.47	5.54	5.56	5.57	5.61	5.73	5.70	5.56	5.49
22	Pitts W. & Chic 1st M 7s 1912.....	5.90	5.81	5.82	5.81	5.80	5.79	5.79	5.77	5.72	5.71	5.70	5.70	5.68
23	Camden & Amboy M 6s Nov 1889.....	5.08	5.13	5.19	5.24	5.19	5.09	5.01	5.07	4.99	5.01	4.98	5.01	4.84
26	St L Alton & T H RR 1st M 7s 1894.....	6.33	6.39	6.30	6.20	6.16	6.09	6.07	6.08	6.54	6.37	6.40	6.31	5.92
30	Morris & Essex 1st M sf 7s 1914.....	6.02	5.99	5.95	5.90	5.90	5.85	5.86	5.86	5.91	5.87	5.90	5.94	5.91
31	N Y & Erie RR 1st M 7s 1897.....	6.15	6.08	6.09	6.04	6.00	5.89	5.73	5.75	5.82	5.80	5.76	5.73	5.63
32	M & So. P. Co. 1st M 6s 1898.....	5.34	5.29	5.32	5.33	5.40	5.33	5.32	5.32	5.44	5.37	5.36	5.31	5.15
33	Lehigh Valley RR 1st M 6s 1898.....	5.78	5.80	5.79	5.85	5.83	5.64	5.52	5.57	5.47	5.54	5.56	5.44	5.32
34	Central RR of New Jersey M 7s 1890.....	5.90	5.78	5.91	5.96	5.84	5.78	5.73	5.72	5.64	5.69	5.61	5.63	5.67
35	Lehigh Coal & Nav Co RR Loan 6s 1897.....	6.85	6.70	6.64	6.69	6.67	6.48	6.71	6.83	6.91	6.87	6.42	6.33	6.26
36	Chicago & Milwaukee RR 1st M 7s 1898.....	6.41	6.40	6.41	6.41	6.24	6.19	6.25	6.34	6.27	6.18	6.17	6.19	6.10
37	Lake Shore R. & W. dividend bonds 7s 1899.....	6.15	6.20	6.10	6.10	6.11	6.14	6.08	6.08	6.02	6.02	6.05	6.07	5.94
38	Lehigh Valley RR 2nd M 7s 1910.....	6.15	6.20	6.10	6.10	6.12	6.14	6.09	6.08	6.02	5.95	5.95	6.01	5.94
39	Lehigh Valley RR 2nd M 7s 1910.....	6.15	6.20	6.10	6.10	6.12	6.14	6.09	6.08	6.02	5.95	5.95	6.01	5.94
40	Chic & Nor West Ry cons sf 7s 1915.....	6.55	6.51	6.52	6.53	6.43	6.40	6.33	6.36	6.39	6.33	6.29	6.10	6.10
41	L Sh & Mich So cons 1st M sf 7s 1900.....	6.24	6.24	6.23	6.27	6.28	6.15	6.07	6.07	6.01	6.06	6.00	6.09	5.87
42	Pennsylvania RR Co gen M 6s 1910.....	5.56	5.57	5.62	5.66	5.62	5.53	5.54	5.56	5.58	5.56	5.48	5.49	5.40
43	New York & Hudson RR cons M 7s 1900.....	5.35	5.38	5.54	5.54	5.54	5.50	5.48	5.51	5.59	5.55	5.46	5.40	5.36
44	New York & Hudson RR cons M 7s 1900.....	5.35	5.38	5.54	5.54	5.54	5.50	5.48	5.51	5.59	5.55	5.46	5.40	5.36
45	Chic Burt & Quincy RR cons M 7s 1903.....	6.27	6.29	6.32	6.30	6.28	6.21	6.10	6.02	6.03	6.03	6.02	5.94	5.89
46	Cleveland & Pitts cons sf M 7s 1900.....	6.28	6.29	6.38	6.30	6.20	6.14	6.15	6.18	6.20	6.18	6.11	6.07	5.94
47	Michigan Central RR cons M 7s 1902.....	6.62	6.62	6.58	6.49	6.35	6.26	6.18	6.20	6.25	6.11	6.11	6.16	5.98

RAILROAD BOND YIELDS

A51

YIELDS OF RAILROAD BONDS
Jan. 1879—Jan. 1880

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
24	Chicago & Alton 1st M 7s 1893.....	5.49	5.19	5.42	5.51	5.40	5.38	5.36	5.17	5.53	5.33	5.32	5.34	5.27
25	Pitts. & Warr. & Chic 1st M 7s 1912.....	5.64	5.59	5.55	5.67	5.54	5.52	5.46	5.24	5.37	5.32	5.42	5.44	5.35
28	St. L. Alton & T. H. RR 1st M 7s 1894.....	5.92	5.83	5.95	5.98	5.87	5.69	5.52	5.65	5.87	5.98	5.96	5.93	5.87
30	Morris & Essex 1st M sf 7s 1914.....	5.91	5.72	5.80	5.82	5.57	5.55	5.43	5.50	5.66	5.64	5.59	5.71	5.44
31	N. Y. & Erie RR 1st M 7s 1897.....	5.63	5.47	5.49	5.57	5.28	5.35	5.16	5.21	5.29	5.26	5.17	5.24	5.27
32	M & St. P. (P. du Ch. dv.) 1st M 8s 1898.....	6.15	5.96	5.98	6.01	5.90	5.86	5.84	5.84	5.91	5.85	5.94	5.82	5.84
33	Lehigh Valley RR 1st M 6s 1898.....	5.00	5.13	5.25	5.29	5.21	4.74	4.75	4.80	4.92	4.92	4.76	4.79	4.74
34	Central RR of New Jersey M 7s 1890.....	5.00	5.13	5.25	5.29	5.21	5.12	5.12	5.10	5.31	5.33	5.39	5.10	5.10
35	Lehigh Coal & Nav. Co. RR Loan 6s 1897.....	5.82	5.46	5.55	5.61	5.44	5.37	5.31	5.25	5.28	5.34	5.25	5.23	5.19
36	Chicago & Milwaukee RR 1st M 7s 1898.....	6.26	6.05	6.10	6.15	6.17	6.11	5.94	5.85	6.00	6.05	5.92	6.01	5.85
37	Lake Shore Ry. dividend bonds 7s 1899.....	6.10	5.85	6.05	5.89	5.74	5.60	5.94	5.76	5.67	5.85	5.75	5.65	5.56
38	Clev. Col. Cin. & Ind. 1st M sf 7s 1899.....	6.04	5.84	5.97	5.90	5.69	5.67	5.65	5.67	5.87	5.87	5.66	5.63	5.66
39	Lehigh Valley RR 2nd M reg 7s 1910.....	5.92	5.82	5.85	5.87	5.75	5.69	5.61	5.73	5.64	5.67	5.81	5.77	5.80
40	Chic. & Nor. West Ry. cons sf 7s 1915.....	6.10	5.89	5.99	5.96	5.82	5.76	5.67	5.64	5.66	5.54	5.79	5.66	5.66
41	L. Sh. & Mich. So. cons 1st M sf 7s 1900.....	5.87	5.66	5.74	5.80	5.39	5.31	5.41	5.48	5.56	5.54	5.79	5.46	5.39
42	Pennsylvania RR. Co. gen M 6s 1910.....	5.40	5.31	5.31	5.36	5.20	5.13	5.07	5.05	5.07	5.09	5.11	5.10	5.09
43	New York & Harlem RR cons M 7s 1900.....	5.36	5.31	5.34	5.38	5.29	5.21	5.11	5.11	5.21	5.21	5.09	5.10	5.01
44	N. Y. & H. R. RR 1st M 7s 1900.....	5.49	5.39	5.49	5.45	5.39	5.35	5.18	5.21	5.29	5.26	5.30	5.29	5.17
45	Chic. Burl. & Quincy RR 1st M 7s 1903.....	5.80	5.71	5.81	5.80	5.67	5.65	5.58	5.46	5.58	5.58	5.57	5.59	5.57
46	Cleveland & Pitts. cons sf M 7s 1900.....	5.94	5.70	5.90	5.86	5.81	5.85	5.90	5.97	5.85	5.63	5.63	5.62	5.61
47	Michigan Central RR cons M 7s 1902.....	5.98	5.67	5.90	5.85	5.65	5.60	5.56	5.62	5.71	5.65	5.64	5.65	5.61
48	Central Pacific RR 1st M 6s 1895.....	5.41	5.21	5.30	5.20	5.13	5.13	5.12	5.15	5.24	5.20	5.24	5.20	5.18
49	Chicago Rk. Is. & Pac. RR 1st M 6s 1917.....	5.39	5.27	5.35	5.28	5.20	5.21	5.19	5.21	5.28	5.23	5.23	5.19	5.12

YIELDS OF RAILROAD BONDS
JAN. 1880—JAN. 1881

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
25	Pitts Ft Wayne & Chic 1st M 7s 1912.....	5.35	5.26	5.20	5.18	5.20	5.21	4.94	4.85	4.80	4.83	4.77	4.74	4.74
30	Morris & Essex 1st M sf 7s 1914.....	5.42	5.49	5.29	5.30	5.29	5.29	5.13	5.04	5.10	5.17	4.94	4.94	4.99
31	N Y & Erie RR 1st M 7s 1897.....	5.27	5.26	5.22	5.24	5.12	5.03	4.91	4.96	4.85	4.82	4.74	4.60	4.57
32	M & St P (P du Ch dv) 1st M 8s 1898.....	5.84	5.71	5.76	5.67	5.71	5.47	5.40	5.36	5.27	5.22	5.14	5.09	5.07
33	Lehigh Valley RR 1st M 6s 1898.....	4.74	4.71	4.67	4.65	4.67	4.54	4.54	4.63	4.61	4.53	4.40	4.31	4.34
35	Lehigh Coal & Nav. Co RR Loan 6s 1897.....	5.19	5.14	5.12	5.26	5.15	5.18	5.23	5.12	4.85	4.87	4.72	4.72	4.72
36	Chicago & Milwaukee RR 1st M 7s 1898.....	5.85	5.82	5.78	5.82	5.84	5.84	5.54	5.42	5.42	5.46	5.16	5.11	5.12
37	Lake Shore Ry dividend bonds 7s 1899.....	5.56	5.58	5.60	5.64	5.66	5.32	5.48	5.48	5.44	5.37	5.25	5.16	5.16
38	Clev Col Cin & Ind 1st M sf 7s 1899.....	5.66	5.62	5.57	5.53	5.51	5.30	5.49	5.37	5.37	5.28	5.14	4.87	4.89
39	Lehigh Valley RR 2nd M reg 7s 1910.....	5.30	5.49	5.38	5.37	5.34	5.30	5.31	5.22	5.11	5.07	5.09	5.07	4.95
40	Chic & Nor West Ry cons sf 7s 1915.....	5.66	5.56	5.62	5.66	5.65	5.65	5.58	5.46	5.45	5.31	5.11	5.02	5.00
41	L Sin & Mich So cons 1st M sf 7s 1900.....	5.39	5.25	5.21	5.42	5.36	5.35	5.21	5.09	5.16	5.16	5.02	4.85	4.65
42	Pennsylvania RR Co gen M 6s 1910.....	5.09	4.97	4.99	5.00	5.09	5.00	4.87	4.81	4.76	4.72	4.72	4.63	4.49
43	New York & Harlem RR cons M 7s 1900.....	5.01	5.06	5.14	5.11	5.09	5.00	4.82	4.80	4.82	4.75	4.55	4.48	4.46
44	N Y C & H R RR 1st M 7s 1903.....	5.17	5.11	5.13	5.16	5.15	5.09	4.88	4.80	4.86	4.82	4.71	4.62	4.55
45	Chic Burl & Quincy RR cons M 7s 1903.....	5.57	5.51	5.50	5.51	5.50	5.49	5.42	5.26	5.25	5.19	5.09	4.97	4.94
46	Cleveland & Pitts cons sf M 7s 1900.....	5.61	5.62	5.59	5.59	5.48	5.48	5.47	5.38	5.39	5.37	5.29	5.25	5.24
47	Michigan Cent RR cons M 7s 1902.....	5.61	5.60	5.60	5.56	5.60	5.63	5.48	5.29	5.34	5.19	4.97	5.00	4.98
48	Central Pac RR 1st M 6s 1898.....	5.61	5.64	5.64	5.61	5.61	5.61	5.48	4.90	4.97	4.97	4.85	4.83	4.82
49	Chicago Rl & Pac RR 1st M 6s 1917.....	5.12	5.02	5.03	5.09	5.07	5.06	4.84	4.85	4.81	4.67	4.67	4.57	4.58
50	Chicago & Nor West cons M 7s 1902.....	5.82	5.81	5.84	5.83	5.77	5.66	5.67	5.63	5.59	5.50	5.27	5.02	5.07
51	Chic St Paul & Minn 1st M 6s 1918.....	5.90	5.80	5.81	5.86	5.89	5.90	5.74	5.73	5.64	5.65	5.65	5.53	5.46
52	St Paul Minn & Man 2nd M 6s 1909.....	6.58	6.52	6.49	6.41	6.35	6.36	6.32	6.33	6.06	5.98	6.01	6.03	5.89
53	Nash Chatt & St L 1st M 7s 1913.....	6.40	6.10	6.12	6.12	6.15	6.22	6.36	6.33	6.36	6.28	5.98	5.87	5.78
54	St P & Sioux City RR 1st M 6s 1919.....	6.20	5.99	5.93	5.93	5.96	5.98	5.93	5.85	5.82	5.74	5.62	5.51	5.34

RAILROAD BOND YIELDS

A53

YIELDS OF RAILROAD BONDS
JAN. 1881—JAN. 1882

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
25	Pitts Ft Wayne & Chic 1st M 7s 1912.....	4.74	4.77	4.80	4.92	4.82	4.77	4.68	4.68	4.73	4.76	4.74	4.76	4.74
26	Mt & E RR 1st M 7s 1914.....	4.90	4.90	4.99	5.03	4.78	4.84	4.64	4.66	4.98	4.96	4.88	4.87	4.87
30	N Y & Erie RR 1st M 7s 1897.....	4.57	4.78	4.77	4.69	4.49	4.37	4.30	4.41	4.57	4.64	4.63	4.70	4.72
32	M & St P (P du Ch dv) 1st M 8s 1898.....	5.07	5.08	5.25	5.03	4.98	4.96	4.86	4.84	5.09	5.09	5.11	5.19	5.02
33	Lehigh Valley RR 1st M 6s 1898.....	4.34	4.28	4.27	4.19	4.02	4.05	4.23	4.26	4.35	4.40	4.21	4.32	4.29
37	Lake Shore Ry dividend bonds 7s 1899.....	5.16	5.14	5.10	5.18	5.03	4.94	4.93	4.97	5.06	5.11	5.08	5.14	5.15
38	Clev Col Cin & Ind 1st M sf 7s 1899.....	4.89	5.00	5.09	5.22	5.05	5.01	5.01	5.02	5.08	5.10	5.01	5.01	5.05
39	Lehigh Valley RR 2nd M reg 7s 1910.....	4.95	4.94	4.84	4.76	4.74	4.77	4.78	4.78	4.84	5.03	5.01	5.01	4.96
40	Chic & Nor West Ry cons sf 7s 1915.....	5.00	5.06	5.18	5.14	5.01	5.00	5.00	5.02	4.98	5.09	5.08	5.16	5.06
41	L Sh & Mich So cons 1st M sf 7s 1900.....	4.63	4.86	4.89	4.91	4.82	4.62	4.63	4.73	4.83	4.73	4.73	4.80	4.60
42	Pennsylvania RR Co gen M 6s 1910.....	4.49	4.52	4.52	4.47	4.37	4.34	4.43	4.40	4.60	4.63	4.58	4.59	4.78
43	New York & Harlem RR cons M 7s 1900.....	4.46	4.56	4.63	4.63	4.46	4.32	4.31	4.34	4.43	4.41	4.30	4.33	4.33
44	N Y C & H R RR 1st M 7s 1903.....	4.55	4.65	4.71	4.71	4.60	4.42	4.37	4.36	4.37	4.48	4.53	4.49	4.51
45	Chic Burl & Quincy RR cons M 7s 1903.....	4.94	5.01	5.10	5.07	4.96	4.88	4.74	4.71	4.77	4.84	4.94	4.96	4.98
46	Cleveland & Pitts cons sf M 7s 1900.....	5.24	5.27	5.27	5.10	4.83	4.80	4.82	4.88	4.90	4.88	4.82	4.72	4.87
47	Michigan Central RR cons M 7s 1902.....	4.98	5.11	5.13	5.09	4.89	4.78	4.91	4.84	5.14	5.27	5.18	5.16	5.17
48	Central Pacific RR 1st M 6s 1910.....	4.78	4.77	4.80	4.79	4.83	4.83	4.45	4.45	4.87	4.65	4.70	4.63	4.58
49	Chicago & P & N RR M 6s 1917.....	4.58	4.66	4.77	4.69	4.59	4.51	4.39	4.45	4.59	4.63	4.63	4.58	4.58
50	Chicago & Nor West cons M 7s 1902.....	5.07	5.23	5.24	5.27	5.09	4.99	4.97	5.07	5.22	5.28	5.22	5.17	5.10
51	Chic St Paul & Minn 1st M 6s 1918.....	5.46	5.35	5.44	5.45	5.34	5.30	5.31	5.29	5.32	5.36	5.39	5.51	5.42
52	St Paul Minn & Man 2nd M 6s 1909.....	5.89	5.75	5.82	5.84	5.71	5.52	5.46	5.48	5.56	5.63	5.62	5.68	5.71
53	Nash Chatt & St L 1st M 7s 1913.....	5.78	5.85	5.88	5.83	5.77	5.54	5.72	5.78	5.81	5.91	5.96	5.95	5.91
54	St P & Sioux City RR 1st M 6s 1919.....	5.34	5.34	5.44	5.45	5.38	5.30	5.33	5.40	5.40	5.42	5.44	5.50	5.49
55	C M & St P (So Min Dv) 1st M 6s 1910.....	5.61	5.62	5.62	5.61	5.51	5.46	5.51	5.61	5.68	5.73	5.68	5.71	5.74
56	Canada Southern Ry 1st M 5s 1908.....	4.83	4.96	5.07	5.09	4.94	4.89	4.99	5.09	5.11	5.23	5.19	5.24	5.31
57	Chic St P Min & Omaha cons M 6s 1930.....	5.66	5.69	5.84	5.89	5.78	5.69	5.82	5.92	5.92	5.97	5.95	6.01	6.09

YIELDS OF RAILROAD BONDS

JAN. 1882—JAN. 1883

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
25	Pitts Ft Wayne & Chic 1st M 7s 1912.....	4.74	4.74	4.77	4.70	4.70	4.69	4.73	4.75	4.77	4.75	4.79	4.74	4.73
30	Morris & Essex 1st M sf 7s 1914.....	4.82	4.94	4.96	4.84	4.81	4.90	4.85	4.80	4.77	4.79	4.84	4.86	4.82
32	M & St P (P du Ch dv) 1st M 8s 1898.....	5.02	4.98	5.09	5.06	5.00	5.03	5.14	5.12	5.11	5.11	5.01	5.12	5.08
33	Lehigh Valley RR 1st M 6s 1898.....	5.13	5.17	5.23	5.22	5.10	5.13	5.16	5.16	5.18	5.22	5.37	5.36	5.28
37	Lake Shore Ry dividend bonds 7s 1899.....	5.13	5.17	5.20	5.16	5.14	5.13	5.17	5.21	5.26	5.20	5.20	5.21	5.16
38	Clev Col Cin & Ind 1st M sf 7s 1899.....	5.05	5.03	5.05	5.00	4.94	4.91	5.04	5.05	5.27	5.43	5.15	5.13	5.08
39	Lehigh Valley RR 2nd M reg 7s 1910.....	4.96	4.97	4.97	4.89	4.92	4.89	4.93	4.89	4.86	4.89	4.93	4.94	4.88
40	Chic & Nor West Ry cons sf 7s 1915.....	5.06	5.11	5.11	5.08	4.98	5.07	5.07	5.10	5.05	4.98	5.07	5.00	5.05
41	L Sh & Mich So cons 1st M sf 7s 1900.....	4.60	4.73	4.88	4.87	5.04	4.92	4.73	4.91	4.89	4.81	4.81	4.81	4.74
42	Pennsylvania RR Co gen M 6s 1910.....	4.78	4.61	4.53	4.51	4.51	4.59	4.52	4.48	4.48	4.51	4.57	4.60	4.58
43	New York & Harlem RR cons M 7s 1900.....	4.33	4.36	4.55	4.49	4.44	4.46	4.47	4.51	4.55	4.49	4.44	4.83	4.62
44	Chic & Nor West RR 1st M 6s 1917.....	4.55	4.53	4.51	4.53	4.56	4.51	4.39	4.48	4.57	4.50	4.57	4.65	4.57
45	Chic & Nor West RR 1st M 6s 1917.....	4.55	4.53	4.51	4.53	4.56	4.51	4.39	4.48	4.57	4.50	4.57	4.65	4.57
50	Chicago & Nor West cons M 7s 1902.....	5.10	5.16	5.24	5.08	5.05	5.05	4.95	5.10	5.12	5.12	5.07	5.02	5.03
51	Chic St Paul & Minn 1st M 6s 1918.....	5.42	5.39	5.44	5.31	5.27	5.29	5.25	5.41	5.35	5.29	5.35	5.35	5.32
52	St Paul Minn & Man 2nd M 6s 1909.....	5.71	5.79	5.70	5.56	5.46	5.56	5.25	5.35	5.31	5.31	5.40	5.46	5.51
53	Nesh Chatt & St L 1st M 7s 1913.....	5.91	5.98	6.06	6.01	5.99	6.05	6.04	6.02	5.99	6.07	6.07	6.03	5.88
54	St P & Sioux City RR 1st M 6s 1919.....	5.49	5.38	5.41	5.39	5.40	5.39	5.39	5.46	5.45	5.40	5.47	5.36	5.31
55	C M & St P (So Min Dv) 1st M 6s 1910.....	5.74	5.81	5.81	5.66	5.59	5.55	5.51	5.50	5.55	5.55	5.58	5.37	5.33
56	Canada Southern Ry 1st M 5s 1908.....	5.31	5.49	5.55	5.48	5.46	5.43	5.50	5.54	5.57	5.58	5.59	5.37	5.33
57	Chic St P Min & Omaha cons M 6s 1930.....	6.09	6.09	6.11	6.00	5.89	5.89	5.78	5.76	5.74	5.68	5.71	5.59	5.54
58	St P Min & Man (Dak Dv) 1st M 6s 1910.....	5.70	5.70	5.70	5.66	5.56	5.56	5.52	5.49	5.58	5.59	5.58	5.59	5.49
59	Philadelphia & Erie gen M 5s 1920.....	4.79	4.82	4.86	4.88	4.91	4.88	4.83	4.86	4.85	4.86	4.90	4.89	4.87
60	C M & St P (C & P W Dv) 1st M 5s 1921.....	5.36	5.55	5.51	5.47	5.47	5.51	5.48	5.45	5.50	5.56	5.61	5.58	5.55

YIELDS OF RAILROAD BONDS
 JAN. 1883—JAN. 1884

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
25	Pitts Ft Wayne & Chic 1st M 7s 1912.....	4.73	4.76	4.76	4.62	4.73	4.76	4.72	4.73	4.72	4.73	4.74	4.77	4.67
30	Morris & Essex 1st M sf 7s 1914.....	5.82	4.89	5.06	5.68	5.83	5.99	5.71	5.78	5.71	5.85	5.03	4.99	5.02
32	M & St P (F du Ch dv) 1st M 6s 1898.....	4.98	4.16	4.24	4.31	4.26	4.22	4.30	4.36	4.40	4.42	4.34	4.30	4.25
33	Lehigh Valley RR 1st M 6s 1898.....	4.98	4.16	4.24	4.31	4.26	4.22	4.30	4.36	4.40	4.42	4.34	4.30	4.25
37	Lake Shore Ry dividend bonds 7s 1899.....	5.16	5.22	5.20	5.21	5.22	5.22	5.16	5.16	5.13	5.13	5.13	5.04	5.02
38	Clev Col Cin & Ind 1st M sf 7s 1899.....	5.08	5.09	5.11	5.10	5.10	5.14	5.02	5.16	5.18	5.15	5.18	5.22	5.24
39	Lehigh Valley RR 2nd M reg 7s 1910.....	4.68	4.88	4.86	4.84	4.90	4.88	4.84	4.92	4.98	4.96	4.90	4.93	4.88
40	Chic & Nor West Ry cons sf 7s 1915.....	5.05	5.08	5.13	5.10	5.11	5.07	5.02	5.01	5.11	5.10	4.99	5.00	5.04
41	L Sh & Mich So cons 1st M sf 7s 1900.....	4.74	4.86	4.98	5.07	5.02	4.95	4.88	4.85	5.00	4.87	4.84	4.96	4.72
42	Pennsylvania RR Co gen M 6s 1910.....	4.58	4.58	4.59	4.62	4.56	4.59	4.61	4.67	4.73	4.75	4.73	4.72	4.68
43	New York & Harlem RR cons M 7s 1900.....	4.62	4.62	4.64	4.61	4.62	4.68	4.66	4.69	4.69	4.72	4.74	4.73	4.47
44	Chic & N York RR 1st M 7s 1900.....	4.74	4.75	4.75	4.74	4.78	4.76	4.80	4.81	4.75	4.73	4.73	4.65	4.53
45	Chic & N York RR 2nd M 7s 1903.....	4.94	4.90	4.90	4.95	4.95	4.93	4.91	4.95	4.95	4.92	4.93	4.88	4.73
46	Cleveland & Pitts cons sf M 7s 1900.....	4.89	4.96	5.01	5.01	5.09	5.05	5.07	5.09	5.12	5.11	5.01	4.99	5.03
47	Michigan Central RR cons M 7s 1902.....	5.07	5.11	5.13	5.11	5.12	5.10	5.06	5.22	5.21	5.19	5.08	5.09	5.05
48	Central Pacific RR 1st M 6s 1895.....	4.59	4.61	4.65	4.64	4.66	4.63	4.70	4.79	4.81	4.79	4.80	4.67	4.34
49	Chicago Rk Is & Pac RR 1st M 6s 1917.....	4.57	4.61	4.66	4.68	4.60	4.61	4.62	4.64	4.59	4.51	4.55	4.51	4.49
50	Chicago & Nor West cons M 7s 1902.....	5.03	5.10	5.15	5.10	5.11	5.15	5.20	5.23	5.22	5.18	5.06	5.18	5.04
51	Chic St Paul & Minn 1st M 6s 1918.....	5.31	5.34	5.37	5.38	5.42	5.48	5.48	5.48	5.46	5.47	5.44	5.46	5.44
52	St Paul Minn & Man 2nd M 6s 1909.....	5.31	5.34	5.37	5.38	5.42	5.48	5.48	5.48	5.46	5.47	5.44	5.46	5.44
53	Nash Chatt & St L 1st M 7s 1913.....	5.88	5.96	5.92	5.89	5.87	5.87	5.86	5.87	5.86	5.87	5.81	5.80	5.82
54	St P & Sioux City RR 1st M 6s 1919.....	5.31	5.40	5.41	5.39	5.27	5.26	5.26	5.21	5.20	5.19	5.15	5.15	5.12
55	C M & St P (So Min Dv) 1st M 6s 1910.....	5.55	5.60	5.65	5.58	5.56	5.54	5.59	5.63	5.61	5.54	5.48	5.51	5.51
56	Canada Southern Ry 1st M 5s 1908.....	5.33	5.44	5.40	5.31	5.30	5.21	5.30	5.33	5.45	5.45	5.34	5.29	5.33
57	Chic St P Min & Omaha cons M 6s 1930.....	5.54	5.62	5.58	5.66	5.61	5.58	5.53	5.46	5.53	5.61	5.57	5.52	5.51
58	St P Min & Man (Dak Dv) 1st M 6s 1910.....	5.49	5.51	5.55	5.43	5.44	5.49	5.50	5.53	5.49	5.47	5.42	5.46	5.42
59	Black & N York RR 1st M 6s 1921.....	4.87	4.84	4.84	4.83	4.85	4.89	4.88	4.90	4.90	4.86	4.85	4.83	4.79
60	C M & St P (C & P Dv) 1st M 6s 1921.....	5.56	5.56	5.54	5.47	5.43	5.37	5.39	5.38	5.47	5.46	5.47	5.38	5.43
61	C M & St P (Wis & Min Dv) 1st M 5s 1921.....	5.26	5.58	5.64	5.63	5.69	5.65	5.64	5.71	5.54	5.69	5.57	5.57	5.71
62	Chic St Louis & N Orleans 3s 1951.....	4.83	4.84	4.88	4.84	4.80	4.75	4.78	4.81	4.84	4.81	4.75	4.65	4.71
63	Pennsylvania Co gu 1st M 4 3/4s 1921.....	4.81	4.80	4.81	4.80	4.81	4.83	4.81	4.84	4.85	4.84	4.82	4.79	4.85

YIELDS OF RAILROAD BONDS
 JAN. 1884—JAN. 1885

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
25	Pitts Ft Wayne & Chic 1st M 7s 1912	4.67	4.62	4.63	4.64	4.61	4.73	4.71	4.69	4.70	4.65	4.70	4.69	4.68
30	Morris & Essex 1st M sf 7s 1914	4.82	4.70	4.75	4.74	4.85	4.93	4.93	4.88	4.88	4.78	4.79	4.70	4.84
32	M & St P (P. & O.) 1st M 6s 1898	5.28	5.27	5.27	5.27	5.02	5.07	5.09	4.99	4.95	5.09	5.10	5.05	4.96
33	St Paul & Northern Pac 1st M 6s 1898	5.28	5.27	5.27	5.27	5.02	5.07	5.09	4.99	4.95	5.09	5.10	5.05	4.96
37	Lake Shore Ry dividend bonds 7s 1899	5.02	4.92	4.94	4.99	5.13	5.18	5.22	5.19	5.27	5.20	5.18	5.14	5.09
38	Clev Col Cin & Ind 1st M sf 7s 1899	5.24	5.09	5.01	4.98	5.18	5.14	5.45	5.21	5.01	4.93	4.97	5.02	5.02
39	Lehigh Valley RR 2nd reg 7s 1910	4.88	4.85	4.87	4.84	4.84	4.87	4.90	4.90	4.97	4.93	4.78	4.83	4.77
40	Chic & Nor West Ry cons sf 7s 1910	5.74	4.98	4.98	4.99	5.21	5.21	5.21	5.02	5.02	5.02	4.97	4.92	4.90
41	Chic & Nor West Ry cons sf 7s 1910	5.74	4.98	4.98	4.99	5.21	5.21	5.21	5.02	5.02	5.02	4.97	4.92	4.90
42	Pennsylvania RR Co gen M 6s 1910	4.68	4.66	4.63	4.65	4.67	4.71	4.57	4.59	4.62	4.58	4.54	4.50	4.41
43	New York & Harlem RR cons M 7s 1900	4.47	4.44	4.47	4.47	4.41	4.54	4.61	4.50	4.56	4.61	4.58	4.53	4.42
44	N Y C & H R RR 1st M 7s 1903	4.53	4.51	4.59	4.50	4.61	4.71	4.65	4.55	4.59	4.71	4.72	4.64	4.46
45	Chic Burl & Quincy RR cons M 7s 1903	4.73	4.71	4.71	4.70	4.85	5.05	5.00	4.97	4.93	4.85	4.86	4.73	4.60
46	Cleveland & Pitts cons M 7s 1903	5.08	4.95	4.95	4.95	5.01	5.03	5.03	4.93	5.03	5.00	4.80	4.72	4.63
47	Michigan Central RR cons M 7s 1902	5.08	4.95	4.95	4.95	5.01	5.02	5.03	4.99	5.02	5.00	4.80	4.72	4.63
48	Central Pacific RR 1st M 6s 1895	4.34	4.68	4.54	4.59	4.80	5.04	5.11	4.77	4.81	4.87	5.06	4.92	4.80
49	Chicago RR & Pac RR 1st M 6s 1917	4.49	4.50	4.52	4.52	4.55	4.59	4.60	4.56	4.57	4.59	4.60	4.56	4.47
50	Chicago & Nor West cons M 7s 1902	5.04	4.95	4.95	4.95	4.88	4.91	5.12	5.16	5.06	5.05	5.02	4.89	4.84
51	Chic St Paul & Minn 1st M 6s 1918	5.07	4.99	4.95	4.98	4.99	5.17	5.17	5.09	5.02	5.09	5.05	5.01	5.00
52	St Paul Minn & Man 2nd M 6s 1909	5.44	5.34	5.27	5.20	5.35	5.69	5.94	5.32	5.47	5.38	5.30	5.39	5.33
53	Nash Chatt & St L 1st M 7s 1913	5.82	5.80	5.78	5.64	5.76	5.80	5.93	5.87	5.92	5.92	5.99	5.84	5.78
54	St P & Sioux City RR 1st M 6s 1919	5.12	5.08	5.00	4.99	5.09	5.11	5.15	5.06	5.04	5.05	5.08	5.07	5.05
55	C M & St P (So Min Dr) 1st M 6s 1910	5.51	5.37	5.29	5.29	5.31	5.64	5.72	5.40	5.51	5.56	5.59	5.50	5.42
56	Canada Southern Ry 1st M 3s 1908	5.33	5.21	5.09	5.03	5.17	5.38	5.41	5.27	5.32	5.37	5.37	5.29	5.28
57	Chic St P Min & Omaha cons M 6s 1930	5.51	5.45	5.38	5.36	5.49	5.67	5.47	5.40	5.45	5.45	5.47	5.41	5.36
58	St P Min & Man (Dak Dr) 1st M 6s 1910	5.42	5.34	5.29	5.28	5.36	5.51	5.48	5.46	5.53	5.49	5.46	5.41	5.39
59	Philadelphia & Erie gen M 3s 1920	4.79	4.77	4.74	4.74	4.74	4.86	4.89	4.90	4.95	4.89	4.86	4.81	4.78
60	C M & St P (C & P W Dr) 1st M 5s 1921	5.43	5.35	5.14	5.08	5.31	5.48	5.41	5.42	5.37	5.46	5.44	5.35	5.43
61	C M & St P (Wis & Min Dr) 1st M 5s 1921	5.43	5.35	5.14	5.08	5.31	5.48	5.41	5.42	5.37	5.46	5.44	5.35	5.43
62	Chic St Louis & N Orleans 5s 1951	4.71	4.71	4.66	4.68	4.68	4.77	4.77	4.77	4.78	4.79	4.82	4.80	4.77
63	Pennsylvania Co gen 1st M 4 1/2s 1921	4.85	4.80	4.78	4.77	4.79	4.86	4.83	4.82	4.79	4.71	4.74	4.71	4.74
64	New York Lack & West 1st M 6s 1921	4.93	4.88	4.90	4.83	4.98	5.15	5.18	5.00	4.96	5.02	5.04	4.99	4.97

YIELDS OF RAILROAD BONDS
JAN. 1885—JAN. 1886

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
25	Pitts Ft Wayne & Chic 1st M 7s 1912.....	4.68	4.67	4.60	4.56	4.57	4.59	4.57	4.48	4.48	4.49	4.50	4.47	4.35
30	Morris & Essex 1st M sf 7s 1914.....	4.84	4.73	4.68	4.72	4.49	4.41	4.57	4.48	4.48	4.48	4.46	4.49	4.47
32	M & St P (P du Ch dv) 1st M 6s 1898.....	4.80	4.88	4.80	4.81	4.86	4.96	4.86	4.86	4.86	4.86	4.86	4.86	4.86
33	Lewish Valley RR 1st M 6s 1898.....	4.03	4.93	4.93	4.93	5.04	5.04	4.99	4.97	4.97	4.96	4.92	4.90	4.89
37	Lake Shore Ry dividend bonds 7s 1899.....	5.09	5.06	4.97	4.92	5.04	5.04	4.99	4.97	4.97	4.96	4.92	4.90	4.89
38	Clev Col Cin & Ind 1st M sf 7s 1899.....	5.02	5.04	5.06	4.80	4.95	5.00	4.93	4.97	4.84	4.80	4.71	4.85	4.63
39	Lewish Valley RR 2nd M reg 7s 1910.....	4.77	4.77	4.70	4.67	4.64	4.63	4.65	4.63	4.60	4.50	4.46	4.44	4.44
40	Chic & Nor West Ry cons sf 7s 1915.....	4.90	4.80	4.78	4.78	4.75	4.64	4.66	4.69	4.71	4.67	4.64	4.64	4.57
41	L Sh & Mich So cons 1st M sf 7s 1900.....	4.65	4.65	4.62	4.52	4.54	4.54	4.48	4.47	4.46	4.46	4.50	4.47	4.34
42	Pennsylvania RR Co gen M 6s 1910.....	4.41	4.38	4.33	4.28	4.20	4.12	4.22	4.26	4.26	4.25	4.19	4.15	4.07
43	New York & Harlem RR cons M 7s 1900.....	4.12	4.21	4.12	4.14	4.05	3.95	3.88	3.80	3.86	3.87	3.77	3.75	3.78
44	N Y C & H R RR 1st M 7s 1905.....	4.50	4.59	4.51	4.52	4.49	4.38	4.36	4.30	4.29	4.20	4.16	4.13	4.12
45	Chic & Ind & Quincy RR 1st M 7s 1903.....	4.60	4.59	4.51	4.52	4.49	4.38	4.36	4.30	4.29	4.20	4.16	4.13	4.12
46	Chic & Ind & Quincy RR 2nd M 7s 1903.....	4.60	4.59	4.51	4.52	4.49	4.38	4.36	4.30	4.29	4.20	4.16	4.13	4.12
47	Michigan Central RR cons M 7s 1902.....	4.99	4.90	4.84	4.93	4.91	4.91	4.91	4.95	4.81	4.66	4.63	4.65	4.51
49	Chicago Rk Is & Pac RR 1st M 6s 1917.....	4.47	4.39	4.37	4.39	4.37	4.29	4.24	4.31	4.30	4.28	4.29	4.29	4.31
50	Chicago & Nor West cons M 7s 1902.....	4.84	4.76	4.71	4.74	4.70	4.65	4.47	4.67	4.71	4.61	4.52	4.54	4.38
51	Chic St Paul & Minn 1st M 6s 1918.....	5.00	4.96	4.81	4.88	4.87	4.81	4.78	4.74	4.71	4.74	4.73	4.67	4.55
52	St Paul Minn & Man 2nd M 6s 1909.....	5.35	5.35	5.21	5.19	5.14	5.04	5.07	5.12	5.01	4.92	4.89	4.84	4.76
53	Nash Chatt & St L 1st M 7s 1913.....	5.78	5.82	5.80	5.74	5.68	5.67	5.62	5.59	5.53	5.40	5.40	5.40	5.37
54	St P & Sioux City RR 1st M 6s 1919.....	5.05	4.98	4.91	4.93	4.86	4.84	4.81	4.82	4.81	4.70	4.69	4.69	4.58
55	C M & St P (So Min Dv) 1st M 6s 1910.....	5.42	5.35	5.30	5.25	5.25	5.21	5.10	5.11	5.14	5.11	5.04	5.01	4.90
56	Canada Southern Ry 1st M 5s 1908.....	5.28	5.26	5.18	5.29	5.37	5.25	5.16	5.05	5.04	4.95	4.90	4.70	4.69
57	Chic St P Min & Omaha cons M 6s 1930.....	5.36	5.34	5.44	5.45	5.42	5.35	5.35	5.35	5.30	5.23	5.15	4.99	4.92
58	St P Min & Man (Dak Dv) 1st M 6s 1910.....	5.39	5.35	5.25	5.27	5.27	5.08	5.10	5.07	5.00	4.94	4.91	4.83	4.71
59	Philadelphia & Erie gen M 5s 1920.....	4.78	4.70	4.68	4.65	4.61	4.58	4.61	4.58	4.54	4.51	4.47	4.49	4.43
60	C M & St P (C & P W Dv) 1st M 5s 1925.....	5.42	5.35	5.30	5.25	5.25	5.21	5.10	5.11	5.14	5.11	5.04	5.01	4.90
61	C M & St P (N Y Min Dv) 1st M 5s 1921.....	5.42	5.35	5.30	5.25	5.25	5.21	5.10	5.11	5.14	5.11	5.04	5.01	4.90
62	Chic St Louis & York 1st M 5s 1915.....	4.77	4.72	4.61	4.65	4.58	4.54	4.51	4.46	4.45	4.46	4.49	4.54	4.44
63	Pennsylvania Co gen 1st M 4 1/2s 1911.....	4.74	4.62	4.61	4.62	4.54	4.51	4.52	4.53	4.55	4.50	4.46	4.46	4.29
64	New York Lack & West 1st M 6s 1921.....	4.97	4.88	4.85	4.81	4.87	4.79	4.65	4.65	4.73	4.74	4.71	4.62	4.43
65	Hannibal & St Joseph cons M 6s 1911.....	5.11	5.03	4.97	4.98	4.93	4.89	4.89	4.90	4.94	4.91	4.89	4.89	4.77

YIELDS OF RAILROAD BONDS
JAN. 1896—JAN. 1887

Ref.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
25	Pitts Bk Wayne & Chic 1st M 7s 1912.....	4.35	4.30	4.29	4.29	4.30	4.31	4.29	4.29	4.42	4.34	4.36	4.41	4.42
30	Morris & Essex 1st M 7s 1914.....	4.47	4.37	4.33	4.33	4.38	4.30	4.30	4.30	4.37	4.40	4.40	4.44	4.44
32	M & St P (P du Ch dv) 1st M 8s 1898.....	4.58	4.56	4.43	4.27	4.32	4.32	4.29	4.27	4.37	4.37	4.40	4.44	4.50
33	Lehigh Valley RR 1st M 6s 1898.....	3.66	3.60	3.55	3.58	3.60	3.65	3.65	3.45	3.50	3.50	3.60	3.62	3.57
37	Lake Shore Ry dividend bonds 7s 1899.....	4.83	4.76	4.69	4.74	4.69	4.67	4.65	4.64	4.70	4.70	4.67	4.68	4.69
38	Clev Col Cin & Ind 1st M 7s 1899.....	4.63	4.47	4.43	4.47	4.60	4.51	4.55	4.60	4.63	4.60	4.54	4.62	4.66
39	Chic & N W RR 1st M reg 7s 1916.....	4.44	4.37	4.32	4.35	4.30	4.26	4.28	4.10	4.21	4.26	4.30	4.19	4.11
40	Chic & N W RR 1st M reg 7s 1916.....	4.34	4.24	4.23	4.25	4.25	4.43	4.43	4.27	4.29	4.32	4.36	4.53	4.53
41	L Sh & Mich So cons 1st M 7s 1900.....	4.34	4.24	4.23	4.25	4.25	4.43	4.43	4.27	4.29	4.32	4.36	4.53	4.53
42	Pennsylvania RR Co gen M 6s 1910.....	4.07	3.90	3.93	3.98	4.12	4.03	3.78	3.83	3.98	4.00	4.10	4.07	3.83
43	New York & Harlem RR cons M 7s 1900.....	3.78	3.80	3.83	3.86	3.83	3.83	3.83	3.92	3.99	4.00	3.95	4.06	3.98
44	N Y C & H R RR 1st M 7s 1903.....	4.12	4.07	4.09	4.05	4.02	3.96	4.02	3.99	4.15	4.19	4.06	4.05	4.11
45	Chic Burlington RR cons M 8s 1903.....	4.12	4.08	4.21	4.25	4.27	4.16	4.17	4.25	4.35	4.39	4.30	4.31	4.19
46	Chic Burlington RR cons M 8s 1903.....	4.12	4.08	4.21	4.25	4.27	4.16	4.17	4.25	4.35	4.39	4.30	4.31	4.19
47	Michigan Central RR cons M 7s 1902.....	4.51	4.51	4.48	4.44	4.40	4.38	4.47	4.44	4.40	4.47	4.42	4.45	4.41
49	Chicago Rk Is & Pac RR 1st M 6s 1917.....	4.31	4.21	4.20	4.21	4.12	4.15	4.07	4.00	3.99	3.92	3.93	4.01	4.53
50	Chicago & Nor West cons M 7s 1902.....	4.38	4.27	4.13	4.23	4.10	4.11	4.14	4.14	4.26	4.33	4.30	4.33	4.13
51	Chic St Paul & Minn 1st M 6s 1918.....	4.55	4.42	4.41	4.42	4.41	4.41	4.45	4.41	4.42	4.46	4.48	4.46	4.45
52	St Paul Minn & Man 2nd M 6s 1909.....	4.76	4.63	4.67	4.70	4.71	4.70	4.68	4.69	4.77	4.70	4.62	4.79	4.72
53	Nash Chatt & St L 1st M 7s 1913.....	5.37	5.27	5.18	5.16	5.30	5.25	5.30	5.03	5.07	5.09	5.07	5.05	4.99
54	St P & Sioux City RR 1st M 6s 1919.....	4.50	4.48	4.48	4.51	4.51	4.47	4.52	4.49	4.51	4.49	4.51	4.57	4.52
55	C M & St P (So Min Div) 1st M 6s 1910.....	4.90	4.81	4.83	4.83	4.83	4.78	4.78	4.70	4.81	4.81	4.81	4.86	4.86
56	Canada Southern Ry 1st M 5s 1908.....	4.69	4.55	4.59	4.64	4.63	4.59	4.52	4.61	4.68	4.63	4.62	4.63	4.59
57	Chic St P Min & Omaha cons M 6s 1930.....	4.92	4.90	4.92	4.91	4.81	4.76	4.83	4.74	4.74	4.76	4.79	4.81	4.80
58	St P Min & Man (Dak Div) 1st M 6s 1910.....	4.71	4.65	4.66	4.69	4.74	4.70	4.70	4.62	4.75	4.72	4.69	4.81	4.73
59	Philadelphia & Erie gen M 5s 1920.....	4.43	4.40	4.34	4.32	4.25	4.27	4.27	4.27	4.42	4.23	4.35	4.40	4.37
60	C M & St P (C & P W Div) 1st M 5s 1921.....	4.84	4.78	4.72	4.72	4.67	4.54	4.54	4.58	4.63	4.68	4.68	4.69	4.65
61	C M & St P (Wis & Min Div) 1st M 5s 1921.....	4.84	4.78	4.72	4.72	4.67	4.54	4.54	4.58	4.63	4.68	4.68	4.69	4.65
62	Chic St Louis & N Orleans 5s 1951.....	4.44	4.35	4.30	4.32	4.33	4.24	4.24	4.17	4.30	4.19	4.30	4.30	4.31
63	Pennsylvania Co gu 1st M 4 1/2s 1921.....	4.29	4.29	4.19	4.29	4.24	4.21	4.21	4.12	4.21	4.21	4.26	4.26	4.23
64	New York Lack & West 1st M 6s 1921.....	4.43	4.37	4.32	4.36	4.39	4.34	4.29	4.28	4.42	4.43	4.42	4.48	4.50
65	Hambat & St Joseph cons M 6s 1911.....	4.77	4.69	4.65	4.62	4.61	4.55	4.52	4.63	4.50	4.55	4.58	4.60	4.61
66	Chic & N W RR 1st M 7s 1909.....	4.40	4.34	4.31	4.31	4.31	4.36	4.28	4.29	4.38	4.31	4.35	4.41	4.41
67	Baltimore & Ohio 1925.....	4.89	4.78	4.74	4.74	4.49	4.40	4.39	4.39	4.43	4.47	4.49	4.54	4.52
68	Chic Milw & St Paul Term M 5s 1914.....	4.89	4.78	4.74	4.74	4.49	4.40	4.39	4.39	4.43	4.47	4.47	4.54	4.52
69	Chicago & N W Ry Deb 5s 1909.....	4.69	4.61	4.58	4.58	4.59	4.51	4.47	4.57	4.59	4.60	4.51	4.50	4.51
70	West Shore R.R 1st M 4s 2361.....	3.90	3.90	3.93	3.94	3.95	3.92	3.88	3.92	3.97	3.98	3.91	3.91	3.90

YIELDS OF RAILROAD BONDS
JAN. 1897—JAN. 1898

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
25	Pitts Ft Wayne & Chic 1st M 7s 1912.....	4.42	4.39	4.39	4.42	4.45	4.46	4.37	4.38	4.37	4.40	4.37	4.45	4.39
30	Morris & Essex 1st M sf 7s 1914.....	4.44	4.46	4.45	4.42	4.40	4.46	4.43	4.45	4.45	4.45	4.51	4.49	4.41
33	Lehigh Valley RR 1st M 6s 1898.....	3.57	3.50	3.58	3.62	3.63	3.63	3.62	3.59	3.59	3.99	3.96	3.72	3.73
37	Lake Shore Ry dividend bonds 7s 1899.....	4.69	4.62	4.63	4.63	4.60	4.61	4.61	4.79	4.80	4.93	4.92	4.74	4.80
38	Clev Col Cin & Ind 1st M sf 7s 1899.....	4.66	4.62	4.71	4.74	4.74	4.81	4.81	4.86	4.90	5.05	4.97	4.87	4.80
39	Lehigh Valley RR 2nd M rev 7s 1910.....	4.11	4.10	4.23	4.27	4.27	4.37	4.35	4.38	4.38	4.54	4.54	4.56	4.58
40	Cin & Nor West Ry cons M 7s 1910.....	4.58	4.59	4.56	4.59	4.56	4.56	4.55	4.55	4.55	4.61	4.62	4.57	4.48
41	Cin & Nor West Ry cons M 7s 1910.....	4.58	4.59	4.56	4.59	4.56	4.56	4.55	4.55	4.55	4.61	4.62	4.57	4.48
42	Penn & Md Ry cons M 6s 1910.....	3.83	3.83	3.77	3.83	3.83	3.91	3.94	3.93	4.03	4.10	4.11	4.00	4.00
43	New York & Harlem RR cons M 6s 1909.....	3.98	4.02	4.01	4.11	4.08	4.03	4.03	4.09	4.09	4.15	4.05	4.01	4.11
44	N Y C & H R RR 1st M 7s 1903.....	4.11	4.10	4.13	4.06	4.06	4.13	3.99	4.20	4.29	4.27	4.10	3.99	4.01
45	Chic Burl & Quincy RR cons M 7s 1903.....	4.16	4.37	4.41	4.41	4.30	4.30	4.32	4.42	4.42	4.49	4.45	4.37	4.29
46	Cleveland & Pitts cons sf M 7s 1910.....	4.41	4.37	4.33	4.41	4.35	4.28	4.29	4.37	4.49	4.49	4.22	4.33	4.47
47	Michigan Central RR cons M 7s 1902.....	4.53	4.45	4.52	4.49	4.49	4.48	4.50	4.59	4.67	4.66	4.69	4.61	4.49
49	Chicago RR & Pac RR 1st M 6s 1917.....	4.13	4.18	4.17	4.12	4.14	4.19	4.18	4.17	4.16	4.24	4.29	4.19	4.14
50	Chicago & Nor West cons M 7s 1902.....	4.28	4.39	4.39	4.42	4.41	4.46	4.46	4.49	4.61	4.63	4.65	4.56	4.30
61	Cin & St Paul & Min 1st M 6s 1918.....	4.74	4.79	4.75	4.75	4.74	4.75	4.75	4.75	4.74	4.74	4.64	4.71	4.62
53	St Paul & Nor West 1st M 6s 1909.....	4.74	4.79	4.75	4.75	4.74	4.75	4.75	4.75	4.74	4.74	4.64	4.71	4.62
53	St Paul & Nor West 1st M 6s 1909.....	4.74	4.79	4.75	4.75	4.74	4.75	4.75	4.75	4.74	4.74	4.64	4.71	4.62
54	St P & Sioux City RR 1st M 6s 1919.....	4.52	4.54	4.58	4.53	4.57	4.58	4.61	4.57	4.63	4.64	4.63	4.66	4.63
55	C M & St P (So Min Div) 1st M 6s 1910.....	4.86	4.85	4.82	4.84	4.89	4.80	4.84	4.91	5.06	5.20	5.12	5.20	5.08
56	Canada Southern Ry 1st M 5s 1908.....	4.59	4.66	4.63	4.62	4.57	4.52	4.61	4.67	4.69	4.73	4.71	4.66	4.53
57	Chic St P Min & Omaha cons M 6s 1930.....	4.84	4.89	4.89	4.84	4.81	4.83	4.90	5.00	5.07	5.08	5.06	5.00	4.92
58	St P Min & Man (Oak Div) 1st M 6s 1910.....	4.73	4.76	4.75	4.75	4.75	4.75	4.75	4.88	5.06	4.86	4.87	4.91	4.75
59	Philadelphia & Erie gen M 5s 1920.....	4.37	4.37	4.33	4.38	4.37	4.36	4.34	4.36	4.45	4.39	4.39	4.45	4.43
60	C M & St P (C & P W Div) 1st M 5s 1921.....	4.57	4.63	4.62	4.60	4.63	4.64	4.74	4.80	4.85	4.93	4.89	4.94	4.84
61	C M & St P (W & Min Div) 1st M 5s 1921.....	4.95	4.95	4.92	4.95	4.95	4.95	4.95	4.95	4.95	5.00	5.04	5.04	4.99
62	Chic St Louis & N Orleans St 1921.....	4.23	4.26	4.23	4.23	4.21	4.21	4.27	4.28	4.34	4.38	4.31	4.34	4.27
63	Pennsylvania Co gen 1st M 4s 1921.....	4.23	4.26	4.23	4.23	4.21	4.21	4.27	4.30	4.34	4.31	4.26	4.22	4.16
64	New York Lack & West 1st M 6s 1921.....	4.50	4.48	4.50	4.51	4.50	4.51	4.45	4.41	4.61	4.62	4.60	4.61	4.44
65	Hannibal & St. Joseph cons M 6s 1911.....	4.61	4.57	4.63	4.69	4.69	4.65	4.81	4.71	4.81	4.84	4.81	4.81	4.75
66	N Y Cent & Hudson River Deb 5s 1904.....	4.41	4.39	4.45	4.43	4.48	4.32	4.33	4.44	4.41	4.39	4.39	4.38	4.38
67	Baltimore & Ohio 5s 1925.....	4.52	4.46	4.42	4.50	4.48	4.48	4.43	4.48	4.41	4.89	4.73	4.73	4.60
68	Chic Milw & St Paul Term M 5s 1914.....	4.80	4.81	4.86	4.83	4.79	4.81	4.86	4.85	4.90	5.00	5.02	5.06	4.98
69	Chicago & N W Ry Deb 5s 1909.....	4.51	4.55	4.59	4.53	4.53	4.57	4.77	4.75	4.84	4.88	4.79	4.79	4.69
70	West Shore RR 1st M 4s 2361.....	3.90	3.91	3.93	3.93	3.92	3.93	4.00	4.06	4.10	4.09	4.06	4.01	3.99
71	Chicago & N W Ry sf Deb 5s 1933.....	4.57	4.58	4.60	4.60	4.56	4.53	4.57	4.63	4.67	4.75	4.68	4.62	4.61

YIELDS OF RAILROAD BONDS
JAN. 1888—JAN. 1889

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
25	Pitts Ft Wayne & Chic 1st M 7s 1912.....	4.39	4.30	4.30	4.28	4.32	4.33	4.27	4.23	4.19	4.24	4.22	4.24	4.19
30	Morris & Essex 1st M sf 7s 1914, 1909.....	4.41	4.32	4.28	4.36	4.37	4.35	4.26	4.28	4.23	4.28	4.23	4.23	4.19
30	Lehigh Valley RR 2nd M sf 7s 1910.....	4.58	4.37	4.30	4.38	4.30	4.30	4.30	4.33	4.31	4.30	4.28	4.32	4.24
39	Lehigh Valley RR 1st M sf 7s 1910.....	4.48	4.42	4.43	4.43	4.45	4.41	4.35	4.35	4.36	4.31	4.28	4.35	4.20
40	Chic & Nor West Ry cons sf 7s 1915.....	4.48	4.42	4.43	4.43	4.45	4.41	4.35	4.35	4.36	4.31	4.28	4.35	4.24
41	L Sh & Mich So cons 1st M sf 7s 1900.....	4.30	4.40	4.47	4.46	4.40	4.31	4.33	4.14	4.19	4.22	4.20	4.17	4.10
42	Pennsylvania RR Co gen M 6s 1910.....	4.00	4.03	4.06	4.04	4.09	4.01	3.84	3.89	3.94	3.95	3.97	3.97	3.93
43	New York & Harlem RR cons M 7s 1900.....	4.11	3.94	4.01	4.08	4.05	4.02	3.82	3.79	3.78	3.74	3.76	3.76	3.69
43	N Y C & H R RR 1st M 7s 1903.....	4.01	3.99	4.06	4.11	4.10	4.02	3.95	3.89	3.91	3.88	3.88	3.89	3.84
43	Chic Burt & Quincy RR cons M 7s 1903.....	4.29	4.29	4.29	4.27	4.30	4.26	4.26	4.21	4.22	4.26	4.23	4.22	4.14
46	Cleveland & Pitts cons sf M 7s 1900.....	4.47	4.51	4.51	4.43	4.34	4.28	4.22	4.22	4.23	4.22	4.06	4.23	4.09
47	Michigan Central RR cons M 7s 1902.....	4.49	4.41	4.49	4.51	4.44	4.36	4.21	4.27	4.32	4.21	4.16	4.02	4.01
49	Chicago Rk Is & Pac RR 1st M 6s 1917.....	4.14	4.10	4.15	4.21	4.18	4.18	4.20	4.19	4.19	4.17	4.16	4.12	4.05
50	Chicago & Nor West cons M 7s 1902.....	4.30	4.28	4.37	4.37	4.34	4.32	4.21	4.23	4.26	4.24	4.29	4.33	4.15
51	Chic St Paul & Minn 1st M 6s 1918.....	4.62	4.54	4.60	4.63	4.60	4.58	4.56	4.54	4.54	4.51	4.54	4.61	4.61
52	St Paul Minn & Man 2nd M 6s 1909.....	4.81	4.80	4.81	4.80	4.77	4.66	4.63	4.66	4.67	4.70	4.74	4.59	4.66
53	Nash Chatt & St Louis 1st M 7s 1913.....	4.91	4.99	5.00	5.04	5.07	5.04	4.93	4.96	5.00	5.01	5.04	4.89	4.99
54	St P & Sioux City RR 1st M 6s 1919.....	4.63	4.59	4.59	4.60	4.61	4.61	4.59	4.53	4.52	4.58	4.59	4.60	4.59
55	C M & St P (So Min Dv) 1st M 6s 1910.....	5.08	5.05	5.13	5.22	5.19	5.30	5.21	5.10	5.29	5.36	5.29	5.28	5.19
56	Canada Southern Ry 1st M 5s 1908.....	4.53	4.58	4.66	4.65	4.57	4.53	4.49	4.57	4.66	4.68	4.63	4.51	4.45
57	Chic St P Min & Omaha cons M 6s 1930.....	4.92	4.91	4.92	4.89	4.88	4.82	4.81	4.89	4.90	4.90	4.89	4.88	4.88
58	St P Min & Man (Dak Dv) 1st M 6s 1910.....	4.79	4.69	4.65	4.71	4.85	4.85	4.81	4.82	4.84	4.83	4.75	4.70	4.72
58	Chic Burt & Quincy RR 1st M 6s 1910.....	4.45	4.39	4.46	4.39	4.37	4.38	4.28	4.28	4.33	4.31	4.30	4.20	4.20
60	Chic Burt & Quincy RR 1st M 6s 1910.....	4.99	4.95	4.95	4.95	4.92	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83
61	C M & St P (Wis & Min Dv) 1st M 5s 1921.....	4.99	4.95	4.95	4.95	4.92	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83
62	Chic St Louis & N Orleans 5s 1951.....	4.27	4.24	4.31	4.24	4.24	4.27	4.24	4.25	4.24	4.30	4.29	4.29	4.28
63	Pennsylvania Co gen 1st M 4 1/2s 1921.....	4.16	4.16	4.14	4.14	4.14	4.09	4.01	4.05	4.08	4.09	4.09	4.12	4.08
64	New York Lack & West 1st M 6s 1921.....	4.44	4.36	4.38	4.38	4.37	4.32	4.23	4.23	4.23	4.28	4.31	4.32	4.31
65	Hannibal & St Joseph cons M 6s 1911.....	4.75	4.69	4.66	4.71	4.70	4.75	4.71	4.71	4.71	4.71	4.70	4.68	4.61
66	N Y Cent & Hudson River Deb 5s 1904.....	4.38	4.31	4.29	4.22	4.22	4.21	4.18	4.19	4.12	4.13	4.15	4.11	4.17
67	Baltimore & Ohio 5s 1925.....	4.60	4.56	4.68	4.68	4.63	4.62	4.57	4.53	4.58	4.68	4.61	4.61	4.59
68	Chic Milw & St Paul Term M 5s 1914.....	4.98	4.96	5.00	4.99	4.97	4.96	4.95	4.95	5.00	5.01	4.99	4.97	4.95
69	Chicago & N W Ry Deb 5s 1909.....	4.99	4.73	4.78	4.77	4.67	4.64	4.61	4.66	4.73	4.72	4.72	4.73	4.66
70	West Shore RR 1st M 4s 2361.....	3.99	3.98	3.98	3.96	3.93	3.92	3.91	3.90	3.91	3.92	3.90	3.89	3.84
71	Chicago & N W Ry sf Deb 5s 1933.....	4.61	4.62	4.65	4.57	4.58	4.60	4.51	4.48	4.48	4.53	4.55	4.54	4.54
72	Chicago & North Western ext 4s 1926.....	4.38	4.41	4.43	4.37	4.28	4.24	4.24	4.24	4.20	4.31	4.32	4.24	4.09
73	St Paul Minn & Man cons M 4 1/2s 1933.....	4.68	4.70	4.74	4.77	4.73	4.71	4.69	4.73	4.73	4.73	4.69	4.65	4.56

YIELDS OF RAILROAD BONDS
Jan. 1889—Jan. 1890

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
25	Pitts Ft Wayne & Chic 1st M 7s 1912.....	4.19	4.17	4.08	4.06	3.88	3.87	3.92	4.00	4.00	4.03	4.04	4.04	4.02
30	Morris & Essex 1st M sf 7s 1914.....	4.19	4.09	4.17	4.19	4.12	4.02	4.12	4.07	4.07	4.03	4.05	4.06	4.10
39	Leligh Valley RR 2nd M ret 7s 1910.....	4.29	4.31	4.31	4.36	4.26	4.26	4.32	4.32	4.25	4.23	4.22	4.23	4.30
40	Chic & Nor West Ry cons sf 7s 1915.....	4.24	4.19	4.21	4.22	4.21	4.21	4.16	4.07	4.03	4.03	4.26	4.28	4.28
41	L Sh & Mich So cons 1st M sf 7s 1900.....	4.10	3.98	4.03	4.04	4.01	3.98	4.01	4.05	4.09	4.07	4.06	4.19	4.08
42	Pennsylvania RR Co gen M 6s 1910.....	3.93	3.96	3.98	3.94	3.99	3.85	3.96	4.04	3.95	3.95	3.95	3.87	3.77
43	New York & Harlem RR cons M 7s 1900.....	3.93	3.95	3.95	3.97	3.94	3.66	3.71	3.78	3.84	3.96	3.91	3.87	3.94
44	Chic & N York RR 1st M 6s 1903.....	3.83	3.78	3.76	3.81	3.83	3.75	3.79	3.76	3.90	3.91	3.97	4.01	4.01
45	Chic & N York RR 2nd M 6s 1903.....	4.14	4.13	4.18	4.17	4.09	4.12	4.15	4.19	4.12	4.11	4.40	4.41	4.40
47	Michigan Central RR cons M 7s 1902.....	4.01	4.02	4.02	4.07	3.97	3.94	4.08	4.15	4.18	4.27	4.25	4.34	4.31
49	Chicago Rk Is & Pac RR 1st M 6s 1917.....	4.05	4.11	4.13	4.12	4.02	3.90	3.96	3.99	3.93	3.92	4.00	3.98	4.19
50	Chicago & Nor West cons M 7s 1902.....	4.15	4.16	4.18	4.25	4.16	4.09	4.10	4.19	4.27	4.32	4.33	4.39	4.31
51	Chic St Paul & Minn 1st M 6s 1918.....	4.61	4.53	4.43	4.51	4.51	4.37	4.34	4.44	4.39	4.39	4.53	4.52	4.56
52	St Paul M n & Man 2nd M 6s 1909.....	4.66	4.59	4.02	4.65	4.56	4.58	4.53	4.51	4.51	4.60	4.69	4.71	4.64
53	Nash Chatt & St L 1st M 7s 1913.....	4.52	4.57	4.71	4.79	4.77	4.59	4.66	4.68	4.74	4.76	4.77	4.76	4.71
54	St P & Sioux City RR 1st M 6s 1919.....	4.59	4.58	4.52	4.49	4.55	4.48	4.51	4.49	4.49	4.47	4.52	4.57	4.55
55	C M & St P (C & P W Dv) 1st M 6s 1910.....	5.19	5.12	5.19	5.16	5.04	4.97	4.95	4.78	4.51	4.78	4.88	4.86	4.84
56	Canada Southern RR 1st M 6s 1908.....	4.45	4.45	4.41	4.38	4.29	4.28	4.37	4.34	4.37	4.44	4.41	4.40	4.41
57	Chic St P Min & Omaha cons M 6s 1910.....	4.88	4.86	4.89	4.89	4.84	4.81	4.78	4.78	4.77	4.85	4.95	4.87	4.82
58	St P Min & Man (Dak Dv) 1st M 6s 1910.....	4.72	4.65	4.73	4.69	4.65	4.59	4.58	4.58	4.59	4.64	4.80	4.80	4.69
59	Philadelphia & Erie gen M 5s 1920.....	4.30	4.24	4.25	4.25	4.20	4.19	4.20	4.19	4.20	4.23	4.22	4.23	4.19
60	C M & St P (C & P W Dv) 1st M 5s 1921.....	4.75	4.71	4.72	4.72	4.65	4.59	4.62	4.64	4.58	4.62	4.68	4.62	4.82
61	C M & St P (Wis & Min dv) 1st M 5s 1921.....	5.00	4.98	5.04	5.01	4.93	4.70	4.90	4.76	4.76	4.74	4.81	4.82	4.82
62	Chic St Louis & N Orleans 3s 1931.....	4.28	4.26	4.08	4.18	4.23	4.20	4.20	4.20	4.20	4.20	4.20	4.20	4.20
63	Pennsylvania Co 1st M 4½s 1921.....	4.68	4.65	4.05	4.10	4.03	4.01	3.99	3.96	3.94	3.95	3.99	3.98	4.00
64	New York Lack & West 1st M 6s 1921.....	4.21	4.10	4.04	4.02	3.99	3.98	3.97	3.98	3.96	4.01	4.05	4.15	4.11
65	Hannibal & St Joseph cons M 6s 1911.....	4.61	4.51	4.51	4.51	4.51	4.46	4.49	4.51	4.60	4.55	4.74	4.75	4.67
66	N Y Cent & Hudson River Deb 5s 1904.....	4.17	4.10	3.99	4.01	3.91	3.81	3.86	3.93	3.97	4.02	4.09	4.16	4.16
67	Baltimore & Ohio 5s 1925.....	4.59	4.52	4.57	4.53	4.60	4.51	4.59	4.56	4.63	4.61	4.64	4.58	4.59
68	Chic Milw & St Paul Term M 5s 1914.....	4.95	4.91	4.96	4.97	4.81	4.67	4.65	4.65	4.66	4.74	4.79	4.82	4.73
69	Chicago & N W Ry Deb 5s 1909.....	4.66	4.61	4.64	4.50	4.59	4.47	4.48	4.52	4.64	4.66	4.63	4.61	4.61
70	West Shore RR 1st M 4s 2361.....	3.84	3.79	3.84	3.79	3.79	3.79	3.79	3.79	3.79	3.79	3.84	3.84	3.83
71	Chicago & N W Ry sf Deb 5s 1933.....	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09
72	Chicago & North Western ext 4s 1926.....	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09	4.09
73	St Paul Minn & Man cons M 4½s 1933.....	4.56	4.51	4.53	4.54	4.43	4.43	4.45	4.45	4.45	4.45	4.45	4.45	4.45
74	Cin Ind St L & Chi gen 1st 4s 1936.....	4.26	4.09	4.15	4.10	4.04	4.01	3.97	3.91	3.93	3.96	4.01	4.07	4.06
75	Pacific RR of Mo 1st ext M 4s 1938.....	4.12	4.06	4.08	4.04	3.98	3.96	3.98	4.03	4.06	4.08	4.13	4.14	4.08
76	Illinois Central RR coll 4s 1952.....	4.05	4.01	4.04	3.97	3.95	3.95	3.97	3.95	3.96	3.99	4.00	3.99	4.00

YIELDS OF RAILROAD BONDS

JAN. 1890—JAN. 1891

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
25	Pitts Fr Wayne & Chic 1st M 7s 1912.	4.02	4.01	4.08	4.05	4.07	4.09	4.07	4.10	4.10	4.09	4.17	4.23	4.14
30	Morris & Essex 1st M 7s 1914.	4.10	4.09	4.14	4.18	4.18	4.19	4.16	4.21	4.20	4.30	4.28	4.30	4.28
39	Lehigh Valley RR 2nd M 7s 1910.	4.30	4.27	4.31	4.35	4.35	4.40	4.45	4.49	4.51	4.54	4.49	4.50	4.48
40	Chic & Nor West Ry cons 6 1/2s 1915.	4.28	4.28	4.32	4.31	4.31	4.32	4.36	4.39	4.41	4.43	4.53	4.58	4.47
42	Pennsylvania RR Co Gen M 6s 1910.	3.77	3.79	3.90	3.94	3.92	4.04	3.98	4.00	4.06	4.20	4.34	4.37	4.17
44	N Y C & H R RR 1st M 7s 1903.	4.01	4.02	4.00	4.07	4.11	4.19	4.19	4.21	4.28	4.23	4.27	4.26	4.11
45	Chic Burl & Quincy RR cons M 7s 1903.	4.40	4.43	4.41	4.49	4.47	4.47	4.47	4.62	4.64	4.68	4.77	4.86	4.66
47	Michigan Central RR cons M 7s 1902.	4.31	4.31	4.39	4.32	4.28	4.27	4.36	4.45	4.44	4.49	4.52	4.65	4.57
49	Chicago Rk Is & Pac RR 1st M 6s 1917.	4.19	4.18	4.22	4.26	4.18	4.23	4.25	4.29	4.35	4.41	4.57	4.55	4.39
50	Chicago & Nor West cons M 7s 1902.	4.31	4.40	4.42	4.40	4.37	4.38	4.39	4.54	4.61	4.62	4.46	4.41	4.28
51	Chic St Paul & Minn 1st M 6s 1918.	4.56	4.58	4.61	4.56	4.51	4.57	4.65	4.66	4.66	4.62	4.61	4.62	4.59
52	St Paul Minn & Man 2nd M 6s 1909.	4.64	4.65	4.61	4.68	4.68	4.71	4.75	4.77	4.80	4.81	4.83	4.95	4.87
53	Nash, Chatt & St L 1st M 7s 1913.	4.71	4.74	4.77	4.80	4.83	4.90	4.95	4.98	4.99	4.98	5.08	5.22	5.08
54	St P & Sioux City RR 1st M 6s 1919.	4.55	4.53	4.61	4.58	4.58	4.62	4.64	4.66	4.61	4.65	4.61	4.71	4.62
55	C M & St P (So Min Dv) 1st M 6s 1910.	4.84	4.91	4.93	4.84	4.90	4.88	4.93	4.99	4.97	5.04	5.12	5.19	5.08
56	Canada Southern Ry 1st M 5s 1908.	4.41	4.33	4.38	4.38	4.41	4.41	4.47	4.53	4.54	4.57	4.74	4.72	4.52
57	Chic St P Min & Omaha cons M 6s 1930.	4.82	4.87	4.91	4.90	4.88	4.80	4.91	4.98	5.04	5.01	5.11	5.13	5.02
58	St P Min & Man (Dak Dv) 1st M 6s 1910.	4.69	4.77	4.67	4.69	4.65	4.64	4.61	4.71	4.79	4.81	4.74	4.90	4.80
59	Philadelphia & Erie gen M 5s 1920.	4.19	4.22	4.26	4.26	4.25	4.26	4.26	4.27	4.26	4.32	4.41	4.34	4.18
60	C M & St P (C & P W Dv) 1st M 5s 1921.	4.62	4.58	4.67	4.66	4.60	4.61	4.57	4.61	4.72	4.77	4.81	4.86	4.68
61	C M & St P (Wis & Min Dv) 1st M 5s 1921.	4.83	4.81	4.86	4.87	4.86	4.82	4.79	4.79	4.81	4.88	5.12	5.05	4.89
62	Chic St Louis & N Orleans 5s 1951.	4.32	4.31	4.37	4.34	4.34	4.33	4.20	4.26	4.32	4.39	4.26	4.44	4.44
63	Pennsylvania Co gen 1st M 4 1/2s 1921.	4.60	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61
64	New York Lack & West 1st M 6s 1921.	4.11	4.11	4.14	4.14	4.13	4.21	4.20	4.23	4.24	4.24	4.31	4.36	4.24
65	Hambal & St Joseph cons M 6s 1911.	4.67	4.65	4.70	4.66	4.79	4.89	4.76	4.87	4.91	4.89	4.92	5.06	4.95
66	N Y Cent & Hudson River Deb 5s 1904.	4.16	4.15	4.01	4.01	3.91	3.99	4.15	4.12	4.08	4.18	4.32	4.41	4.26
67	Baltimore & Ohio 5s 1925.	4.59	4.60	4.59	4.54	4.59	4.56	4.59	4.56	4.65	4.65	4.74	4.72	4.62
68	Chic Milw & St Paul Term M 5s 1914.	4.73	4.78	4.82	4.82	4.81	4.77	4.78	4.76	4.82	4.91	5.10	5.14	4.88
69	Chicago & N W Ry Deb 5s 1909.	4.61	4.53	4.55	4.60	4.63	4.59	4.58	4.69	4.68	4.67	4.70	4.85	4.69
70	West Shore RR 1st M 4s 2361.	3.83	3.82	3.84	3.84	3.84	3.85	3.85	3.88	3.88	3.91	3.99	4.04	3.95
71	Chicago & N W Ry sf Deb 4s 1933.	4.53	4.50	4.49	4.52	4.52	4.51	4.55	4.59	4.61	4.62	4.76	4.71	4.66
72	Chicago & North Western ext 4s 1926.	4.24	4.16	4.19	4.09	4.09	4.05	4.09	4.08	4.07	4.08	4.12	4.25	4.18
73	St Paul Minn & Man cons M 4 1/2s 1933.	4.42	4.48	4.49	4.49	4.49	4.48	4.49	4.49	4.47	4.46	4.46	4.61	4.46
74	Cin Ind St L & Chi gen 1st 4s 1936.	4.06	4.05	4.03	4.02	4.03	4.03	4.03	4.12	4.15	4.20	4.17	4.19	4.26
75	Pacific RR of Mo 4th ext M 4s 1938.	4.08	4.04	4.08	4.07	4.08	4.09	4.10	4.23	4.15	4.18	4.18	4.27	4.11
76	Illinois Central RR coll 4s 1952.	4.00	4.00	3.98	3.98	4.00	3.99	4.01	4.03	4.04	4.06	4.11	4.13	4.22
77	Lake Erie & Western 1st M 5s 1937.	4.46	4.48	4.50	4.56	4.40	4.50	4.50	4.51	4.55	4.65	4.71	4.77	4.61
78	Wabash RR Co 1st M 5s 1939.	4.90	4.89	4.92	4.88	4.88	4.91	4.94	5.02	5.04	5.04	5.18	5.29	5.08

RAILROAD BOND YIELDS

A63

YIELDS OF RAILROAD BONDS
Jan. 1891-Jan. 1892

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
25	Pitts Ft. Wayne & Chic 1st M 7s 1912.....	4.14	4.18	4.18	4.20	4.21	4.25	4.26	4.26	4.26	4.26	4.31	4.26	4.22
26	Morrin & Essex RR 1st M 7s 1914.....	4.36	4.36	4.36	4.36	4.36	4.36	4.36	4.36	4.36	4.36	4.36	4.36	4.36
27	St Paul & Northern Pac 1st M 7s 1910.....	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38	4.38
30	Chic & Nor West Ry cons 7s 1915.....	4.47	4.50	4.49	4.47	4.55	4.67	4.70	4.69	4.69	4.69	4.56	4.41	4.37
40	Pennsylvania RR Co gen M 6s 1910.....	4.17	4.12	4.10	4.00	3.95	3.98	3.98	3.94	3.93	3.92	3.92	3.92	3.92
42	N Y C & H R RR 1st M 7s 1903.....	4.11	4.23	4.20	4.31	4.35	4.44	4.35	4.41	4.41	4.45	4.37	4.34	4.26
44	Chic & N W RR 1st M 7s 1905.....	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.46	4.46
47	Michigan Central RR cons M 7s 1902.....	4.57	4.60	4.57	4.61	4.70	4.67	4.60	4.59	4.60	4.66	4.63	4.54	4.54
49	Chicago RR 1st & Pac RR 1st M 6s 1917.....	4.39	4.32	4.40	4.46	4.56	4.73	4.72	4.73	4.69	4.73	4.60	4.52	4.45
50	Chicago & Nor West cons M 7s 1902.....	4.28	4.25	4.35	4.44	4.56	4.59	4.56	4.57	4.65	4.57	4.43	4.48	4.30
51	Chic St Paul & Man 1st M 6s 1918.....	4.59	4.60	4.60	4.74	4.70	4.70	4.81	4.84	4.83	4.67	4.71	4.63	4.61
52	St Paul Minn & Man 2nd M 6s 1909.....	4.87	4.79	4.80	4.82	4.87	4.79	4.81	4.87	4.90	4.84	4.84	4.80	4.77
53	Nash Chatt & St L 1st M 7s 1913.....	5.08	5.11	5.17	5.15	5.18	5.20	5.17	5.20	5.19	5.19	4.95	4.92	4.92
54	St P & S Sioux City RR 1st M 6s 1919.....	4.62	4.62	4.67	4.70	4.74	4.60	4.79	4.60	4.79	4.60	4.67	4.67	4.63
55	C M & St P (So Min Div) 1st M 6s 1910.....	5.08	5.00	5.10	5.12	5.13	5.16	5.07	4.99	5.09	4.99	4.90	4.81	4.84
56	Canada Southern Ry 1st M 5s 1908.....	4.52	4.49	4.54	4.55	4.67	4.76	4.72	4.70	4.67	4.56	4.52	4.48	4.48
57	Chic St P Min & Omaha cons M 6s 1936.....	5.02	5.06	5.11	5.09	5.09	5.13	5.05	5.05	5.11	5.02	5.00	4.92	4.86
58	St P Min & Man (Dak Div) 1st M 6s 1910.....	4.80	4.74	4.68	4.56	4.89	4.84	4.93	4.71	4.83	4.81	4.76	4.78	4.76
59	Philadelphia & Erie gen M 5s 1920.....	4.44	4.37	4.40	4.39	4.30	4.40	4.36	4.39	4.31	4.27	4.26	4.26	4.26
60	C M & St P (C & P W Div) 1st M 5s 1921.....	4.63	4.69	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76	4.76
61	C M & St P (Wis & Min Div) 1st M 5s 1921.....	4.69	4.91	5.00	4.99	5.01	5.03	4.86	4.94	4.95	4.87	4.77	4.79	4.78
62	Chic St Louis & N Orleans 5s 1951.....	4.44	4.40	4.58	4.57	4.60	4.63	4.51	4.69	4.64	4.59	4.47	4.41	4.33
63	Vermont & Canada Co gen 1st M 4 1/2s 1911.....	4.24	4.20	4.28	4.28	4.31	4.31	4.32	4.35	4.36	4.35	4.45	4.48	4.41
64	St Paul & Northern Pac 2nd M 5s 1911.....	4.34	4.30	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35
65	Humboldt & St Joseph cons M 6s 1911.....	4.95	4.91	5.07	5.00	5.05	5.12	5.14	5.09	5.01	4.99	4.91	4.79	4.76
66	N Y Cent & Hudson River Dec 5s 1904.....	4.26	4.27	4.42	4.42	4.45	4.66	4.53	4.64	4.52	4.55	4.44	4.38	4.27
67	Baltimore & Ohio 5s 1925.....	4.82	4.62	4.65	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64	4.64
68	Chic & N W RR 1st M 5s 1914.....	4.68	4.71	4.71	4.75	4.79	4.85	4.80	4.85	4.77	4.80	4.82	4.70	4.67
69	Chic & N W RR Dec 5s 1909.....	4.69	4.68	4.71	4.75	4.79	4.85	4.80	4.85	4.77	4.80	4.82	4.70	4.67
70	West Shore RR 1st M 4s 2361.....	3.95	3.92	3.94	3.94	3.96	3.99	4.01	4.00	3.95	3.99	3.98	3.95	3.90
71	Chicago & N W Ry of Dec 5s 1933.....	4.66	4.60	4.72	4.85	4.91	4.96	4.86	4.96	4.86	4.86	4.86	4.86	4.86
72	St Paul Minn & Man cons M 4 1/2s 1936.....	4.18	4.27	4.31	4.30	4.35	4.41	4.30	4.38	4.38	4.36	4.36	4.36	4.36
73	St Paul Minn & Man cons M 4 1/2s 1936.....	4.18	4.27	4.31	4.30	4.35	4.41	4.30	4.38	4.38	4.36	4.36	4.36	4.36
74	Cin Ind St L & Chi gen 1st 4s 1936.....	4.26	4.23	4.32	4.31	4.36	4.37	4.35	4.46	4.43	4.45	4.37	4.44	4.36
75	Pacific RR of Mo 1st ext M 4s 1938.....	4.11	4.13	4.13	4.20	4.20	4.30	4.37	4.31	4.32	4.24	4.18	4.09	4.09
76	Illinois Central RR call 4s 1959.....	4.22	4.25	4.33	4.39	4.29	4.29	4.30	4.31	4.32	4.29	4.31	4.25	4.18
77	Lake Erie & Western 1st M 5s 1937.....	4.61	4.55	4.59	4.61	4.65	4.72	4.71	4.69	4.69	4.70	4.65	4.65	4.55
78	Wabash RR Co 1st M 5s 1939.....	5.08	5.02	5.08	5.05	5.13	5.16	5.14	5.07	5.05	5.00	4.96	4.90	4.85
79	Ches & O (East Ext) 1st M 6s 1911.....	4.84	4.80	4.82	4.90	4.87	4.97	5.27	5.02	4.97	4.97	4.89	4.79	4.79

YIELDS OF RAILROAD BONDS
JAN. 1892-JAN. 1893

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
25	Pitts Ft. Wayne & Chic 1st M 7s 1912.....	4.22	4.20	4.24	4.25	4.27	4.27	4.17	4.10	4.13	4.18	4.19	4.22	4.20
30	Morris & Essex 1st M sf 7s 1914.....	4.26	4.23	4.24	4.21	4.22	4.22	4.18	4.21	4.21	4.27	4.27	4.28	4.29
39	Lehigh Valley RR 2nd M reg 7s 1910.....	4.31	4.33	4.34	4.31	4.33	4.25	4.25	4.27	4.31	4.25	4.25	4.30	4.30
40	Chic & Nor West Ry cons sf 7s 1915.....	4.37	4.44	4.44	4.33	4.30	4.35	4.35	4.37	4.41	4.38	4.41	4.40	4.38
42	Pennsylvania RR Co gen M 6s 1910.....	3.85	3.89	3.93	3.92	3.92	3.85	3.74	3.81	3.80	3.80	3.87	3.90	3.88
43	N Y C & H R RR 1st M 7s 1903.....	4.26	4.22	4.20	4.13	4.13	4.07	4.07	4.13	4.21	4.27	4.27	4.28	4.26
45	Chic East R RR 1st M 7s 1903.....	4.51	4.53	4.53	4.51	4.47	4.41	4.41	4.43	4.51	4.50	4.50	4.51	4.50
46	Chic East R RR 1st M 6s 1917.....	4.58	4.50	4.46	4.43	4.43	4.43	4.43	4.41	4.51	4.50	4.50	4.51	4.49
50	Chicago Rk Is & Pac RR 1st M 6s 1917.....	4.77	4.65	4.68	4.63	4.60	4.58	4.58	4.62	4.68	4.67	4.67	4.66	4.63
52	St Paul Minn & Man 2nd M 6s 1909.....	4.92	4.90	4.99	4.99	4.97	4.86	4.81	4.86	4.98	4.99	5.01	5.00	4.88
53	Nash Chatt & St L 1st M 7s 1913.....	4.63	4.62	4.62	4.55	4.55	4.58	4.50	4.58	4.61	4.59	4.56	4.54	4.54
54	St P & Sioux City RR 1st M 6s 1919.....	4.84	4.76	4.69	4.70	4.72	4.74	4.69	4.59	4.71	4.75	4.75	4.81	4.80
55	C M & St P (So Min Div) 1st M 6s 1910.....	4.48	4.41	4.43	4.46	4.44	4.44	4.40	4.52	4.56	4.58	4.59	4.56	4.50
56	Canada Southern Ry 1st M 5s 1908.....	4.56	4.58	4.58	4.57	4.78	4.80	4.82	4.83	4.86	4.88	4.87	4.87	4.84
57	St P Minn & Omaha cons M 6s 1930.....	4.76	4.69	4.68	4.71	4.66	4.60	4.57	4.58	4.67	4.62	4.63	4.64	4.66
58	St P Minn & Man (Oak Div) 1st M 6s 1910.....	4.24	4.24	4.39	4.29	4.25	4.27	4.17	4.18	4.29	4.18	4.18	4.17	4.15
59	Philadelphia & Erie gen M 5s 1920.....	4.62	4.59	4.59	4.56	4.47	4.48	4.47	4.43	4.49	4.58	4.49	4.50	4.44
60	C M & St P (C & P W Div) 1st M 5s 1921.....	4.78	4.71	4.73	4.69	4.64	4.65	4.64	4.58	4.62	4.66	4.70	4.70	4.69
61	C M & St P (Wis & Min Div) 1st M 5s 1921.....	4.43	4.41	4.38	4.36	4.32	4.30	4.31	4.27	4.28	4.29	4.31	4.33	4.28
62	Chic St Louis & N Orleans 5s 1951.....	4.15	4.21	4.15	4.13	4.13	4.11	4.12	4.12	4.15	4.17	4.17	4.13	4.13
63	Pennsylvania Co gen 1st M 4 1/2s 1921.....	4.41	4.37	4.36	4.38	4.39	4.26	4.28	4.22	4.35	4.31	4.32	4.32	4.33
64	New York Lack & West 1st M 6s 1921.....	4.27	4.25	4.23	4.21	4.22	4.22	4.22	4.23	4.23	4.23	4.23	4.23	4.23
65	Illinois & Michigan cons M 6s 1910.....	4.37	4.28	4.23	4.21	4.22	4.22	4.22	4.23	4.23	4.23	4.23	4.23	4.23
66	N Y C & H R RR Deb 5s 1904.....	4.56	4.56	4.53	4.43	4.48	4.45	4.40	4.43	4.40	4.39	4.42	4.41	4.41
67	Baltimore & Ohio 5s 1925.....	4.65	4.59	4.53	4.43	4.48	4.45	4.40	4.43	4.40	4.39	4.42	4.41	4.41
68	Chic Milw & St Paul Term M 5s 1914.....	4.74	4.72	4.65	4.61	4.61	4.60	4.52	4.43	4.52	4.52	4.55	4.65	4.58
69	Chicago & N W Ry Deb 5s 1909.....	4.67	4.69	4.61	4.66	4.67	4.65	4.55	4.64	4.70	4.69	4.67	4.75	4.75
70	West Shore RR 1st M 4s 2361.....	3.90	3.89	3.90	3.90	3.87	3.86	3.89	3.89	3.92	3.93	3.91	3.92	3.94
71	Chicago & N W Ry sf Deb 5s 1933.....	4.71	4.71	4.78	4.77	4.69	4.63	4.63	4.58	4.66	4.60	4.59	4.61	4.63
72	Chicago & North Western ext 4s 1926.....	4.19	4.14	4.14	4.13	4.11	4.10	4.15	4.14	4.20	4.19	4.19	4.24	4.24
73	St Paul Minn & Man cons M 4 1/2s 1933.....	4.36	4.61	4.61	4.47	4.50	4.49	4.48	4.48	4.50	4.53	4.51	4.51	4.50
74	Cin Ind St L & Chi gen 1st 4s 1936.....	4.36	4.25	4.27	4.26	4.25	4.28	4.28	4.30	4.20	4.26	4.30	4.31	4.32
75	Pacific RR of Mo 1st ext M 4s 1938.....	4.09	4.09	4.04	4.12	4.12	4.11	4.14	4.16	4.14	4.14	4.11	4.20	4.02
76	Illinois Central RR colt M 4s 1952.....	4.18	4.03	4.04	4.02	3.99	4.01	3.94	3.91	3.98	3.95	3.99	4.00	4.00
77	Lake Erie & Western 1st M 5s 1937.....	4.55	4.50	4.51	4.50	4.45	4.42	4.46	4.47	4.53	4.51	4.52	4.56	4.49
78	Wabash RR Co 1st M 5s 1939.....	4.85	4.80	4.84	4.79	4.74	4.74	4.74	4.79	4.85	4.82	4.82	4.87	4.86
79	Ches & O (East Ext) 1st M 6s 1911.....	4.79	4.69	4.75	4.78	4.73	4.72	4.72	4.76	4.68	4.73	4.74	4.77	4.77
80	Rome Water & Ogden cons M 5s 1922.....	4.30	4.27	4.28	4.29	4.28	4.28	4.27	4.28	4.32	4.27	4.27	4.32	4.28
81	N Y Chic & St Louis 1st M 4s 1937.....	4.25	4.18	4.20	4.19	4.17	4.08	4.15	4.25	4.32	4.19	4.17	4.19	4.19
82	Ches & Ohio Ry 1st cons 5s 1939.....	4.50	4.84	4.86	4.81	4.78	4.80	4.83	4.86	4.89	4.88	4.89	4.95	4.88

YIELDS OF RAILROAD BONDS
Jan. 1893-Jan. 1894

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
25	Pitts Fk Wayne & Chic 1st M 7s 1912.....	4.20	4.25	4.32	4.38	4.40	4.46	4.52	4.72	4.77	4.66	4.63	4.46	4.40
30	Mont & Erie 1st M 6s 1914.....	4.29	4.23	4.23	4.28	4.32	4.41	4.49	4.72	4.72	4.72	4.29	4.20	4.22
39	Lehigh Valley RR 2nd M reg 7s 1910.....	4.30	4.45	4.44	4.43	4.38	4.41	4.40	4.92	4.82	4.78	4.68	4.59	4.46
40	Chic & Nor West Ry cons sf 7s 1915.....	4.48	4.52	4.56	4.56	4.64	4.79	4.77	4.77	4.62	4.59	4.41	4.31	4.31
42	Pennsylvania RR Co gen M 6s 1910.....	3.88	3.83	3.86	3.86	3.82	3.92	3.98	4.04	4.00	4.07	4.11	3.90	3.63
49	Chicago Rk Is & Pac RR 1st M 6s 1917.....	4.49	4.43	4.50	4.52	4.68	4.65	4.88	5.03	4.59	4.54	4.47	4.39	4.38
52	St Paul Minn & Man 2nd M 6s 1909.....	4.63	4.59	4.62	4.61	4.58	4.69	5.11	5.20	5.07	4.89	4.89	4.71	4.63
54	St Paul Minn & Man 1st M 6s 1910.....	4.58	4.58	4.60	4.58	4.58	5.22	5.22	5.45	5.31	5.28	5.28	4.50	4.43
55	C & St P (So Min Dv) 1st M 6s 1910.....	4.80	4.66	4.76	4.83	5.03	5.11	5.20	5.42	5.20	5.11	4.95	4.81	4.88
56	Canada Southern Ry 1st M 5s 1908.....	4.50	4.43	4.50	4.48	4.60	4.64	4.90	5.00	4.76	4.68	4.43	4.37	4.36
57	Chic St P Min & Omaha cons M 6s 1930.....	4.84	4.80	4.80	4.82	5.00	5.02	5.19	5.32	5.10	4.99	4.89	4.80	4.82
58	St P Min & Man (Dak Dv) 1st M 6s 1910.....	4.66	4.58	4.73	4.60	4.71	4.82	5.08	5.27	4.94	4.94	4.77	4.76	4.76
59	Philadelphia & Erie gen M 5s 1920.....	4.15	4.14	4.33	4.20	4.19	4.23	4.40	4.32	4.37	4.39	4.39	4.28	4.24
60	C & St P (C & P W Dv) 1st M 5s 1921.....	4.44	4.41	4.43	4.43	4.44	4.54	4.64	4.76	4.52	4.56	4.54	4.52	4.52
61	C & St P (Wis & Min Dv) 1st M 5s 1921.....	4.69	4.67	4.65	4.63	4.64	4.68	5.05	5.01	4.96	4.87	4.75	4.71	4.72
62	Chic St Louis & N Orleans 5s 1951.....	4.28	4.23	4.18	4.28	4.31	4.34	4.43	4.46	4.45	4.43	4.42	4.44	4.48
63	Pennsylvania Co gu 1st M 4 1/2s 1921.....	4.13	4.07	4.06	3.99	4.08	4.11	4.25	4.23	4.09	4.12	4.11	4.06	4.13
64	New York Lack & West 1st M 6s 1921.....	4.23	4.20	4.27	4.33	4.54	4.60	4.66	4.81	4.77	4.59	4.39	4.28	4.27
65	Hannibal & St Joseph cons M 6s 1911.....	4.81	4.81	4.81	4.83	4.88	4.95	5.23	5.44	5.08	5.00	4.78	4.69	4.81
66	N Y Cent & Hudson River Deb 5s 1904.....	4.33	4.36	4.29	4.23	4.28	4.42	4.69	4.95	4.67	4.51	4.30	4.34	4.31
67	Baltimore & Ohio 5s 1925.....	4.41	4.41	4.39	4.40	4.44	4.49	4.61	4.59	4.52	4.51	4.47	4.40	4.33
68	Chic Milw & St Paul Term M 5s 1914.....	4.58	4.50	4.71	4.50	4.60	4.58	5.00	5.02	4.72	4.72	4.72	4.72	4.72
69	Chicago & N Y Ry Deb 5s 1909.....	4.77	4.77	4.71	4.71	4.66	4.68	4.72	5.00	5.00	5.00	5.00	4.72	4.72
70	West Shore RR 1st M 4s 2361.....	3.94	3.93	3.98	4.02	4.03	4.03	4.03	4.21	4.11	4.02	3.93	3.92	3.95
71	Chicago & N W Ry of Deb 5s 1933.....	4.63	4.46	4.55	4.56	4.57	4.63	4.75	4.87	4.78	4.80	4.68	4.62	4.64
72	Chicago & North Western ext 4s 1926.....	4.24	4.23	4.30	4.35	4.34	4.44	4.53	4.66	4.52	4.32	4.31	4.19	4.26
73	St Paul Minn & Man cons M 4 1/2s 1933.....	4.50	4.40	4.40	4.40	4.45	4.40	4.49	4.65	4.64	4.57	4.53	4.54	4.60
74	Cin Ind St L & Cin gen 1st 4s 1936.....	4.32	4.33	4.38	4.38	4.41	4.46	4.59	4.57	4.60	4.67	4.60	4.43	4.52
75	Pacific RR of Mo 1st ext M 4s 1938.....	4.02	4.00	4.02	4.09	4.12	4.14	4.18	4.29	4.23	4.34	4.16	4.25	4.23
76	Illinois Central RR coll 4s 1952.....	4.00	3.98	3.88	3.87	3.87	4.00	4.04	4.08	4.07	4.01	4.02	4.07	4.08
77	Laurel & Western RR 5s 1937.....	4.00	3.98	3.98	3.90	4.35	4.00	4.05	4.67	4.59	4.61	4.52	4.40	4.45
78	Wabash RR Co gen M 1930.....	4.86	4.79	4.82	4.80	4.90	5.01	5.02	5.06	4.95	4.87	4.87	4.90	4.90
79	Ches & O (East Ext) 1st M 6s 1911.....	4.77	4.69	4.76	4.72	4.79	4.78	5.04	5.32	5.13	4.88	4.81	4.67	4.78
80	Rome Water & Ogden cons M 5s 1922.....	4.28	4.25	4.26	4.31	4.36	4.39	4.58	4.74	4.51	4.49	4.33	4.28	4.24
81	N Y Chic & St Louis 1st M 4s 1937.....	4.19	4.15	4.19	4.23	4.33	4.35	4.42	4.54	4.42	4.34	4.27	4.17	4.17
82	Ches & Ohio Ry 1st cons 5s 1939.....	4.88	4.81	4.86	4.82	4.90	5.08	5.30	5.45	5.14	4.98	4.82	4.70	4.94

YIELDS OF RAILROAD BONDS

JAN. 1894—JAN. 1895

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
30	Morris & Essex 1st M of 7s 1914.....	4.22	4.19	4.16	4.19	4.03	4.07	3.98	4.02	4.07	3.80	3.84	3.87	3.90
31	St. Paul & Northern P. 1st M of 7s 1914.....	4.46	4.39	4.32	4.30	4.20	4.35	4.43	4.29	4.48	4.34	4.18	4.15	4.12
32	Chic. & N. W. Ry. 1st M of 7s 1914.....	3.81	3.71	3.63	3.73	3.58	4.10	4.75	4.12	4.38	3.83	3.98	3.98	3.99
33	Pennsylvania RR Co gen M 6s 1910.....	4.38	4.28	4.25	4.25	4.30	4.30	4.26	4.36	4.47	3.48	3.77	3.77	3.74
34	Chicago RR & S. Pac RR 1st M 6s 1917.....	4.38	4.28	4.25	4.25	4.30	4.30	4.26	4.36	4.47	3.48	3.77	3.77	3.74
35	St. Paul Minn. & Man. 2nd M 6s 1909.....	4.63	4.59	4.45	4.39	4.45	4.48	4.54	4.56	4.48	4.41	4.37	4.40	4.45
36	Nash, Chatt. & St. L. 1st M 7s 1913.....	4.93	4.94	4.92	4.88	4.80	4.80	4.82	4.80	4.68	4.56	4.48	4.45	4.45
37	St. Paul & Northern P. 1st M 6s 1910.....	4.44	4.42	4.38	4.28	4.35	4.32	4.30	4.34	4.43	4.22	4.15	4.15	4.20
38	C. M. & St. P. (So. Min. Div.) 1st M 6s 1910.....	4.88	4.81	4.69	4.65	4.71	4.68	4.71	4.73	4.78	4.60	4.53	4.55	4.47
39	Canada Southern Ry 1st M 5s 1908.....	4.36	4.21	4.20	4.19	4.28	4.18	4.13	4.11	4.08	4.05	3.95	3.95	4.02
40	Chic. St. P. Min. & Omaha cons M 6s 1930.....	4.82	4.71	4.70	4.65	4.61	4.61	4.61	4.62	4.65	4.51	4.50	4.51	4.61
41	St. P. Min. & Man. (Dak. Div.) 1st M 6s 1910.....	4.76	4.71	4.53	4.50	4.50	4.50	4.50	4.51	4.55	4.41	4.35	4.35	4.31
42	Philadelphia & Erie gen M 5s 1920.....	4.24	4.21	4.21	4.07	4.07	4.15	4.16	4.14	4.09	4.08	3.95	3.92	3.91
43	C. M. & St. P. (C. & P. W. Div.) 1st M 5s 1921.....	4.52	4.50	4.45	4.41	4.42	4.44	4.47	4.47	4.42	4.33	4.34	4.30	4.31
44	C. M. & St. P. (Wis. & Min. Div.) 1st M 5s 1921.....	4.72	4.58	4.56	4.60	4.56	4.63	4.66	4.58	4.53	4.53	4.52	4.53	4.49
45	Chic. St. Louis & N. Orleans 5s 1951.....	4.46	4.47	4.47	4.45	4.45	4.48	4.37	4.33	4.31	4.28	4.29	4.31	4.26
46	Pennsylvania Co. 1st M 6s 1911.....	4.15	4.11	4.01	3.88	3.82	3.87	3.90	3.89	3.89	3.82	3.94	3.90	3.90
47	New York Lack. & West 1st M 6s 1911.....	4.81	4.73	4.68	4.58	4.51	4.06	4.09	4.02	4.02	4.01	4.01	3.98	3.97
48	Hannibal & St. Joseph cons M 6s 1911.....	4.87	4.77	4.73	4.58	4.51	4.06	4.09	4.02	4.02	4.01	4.01	3.98	3.97
49	Baltimore & Ohio 5s 1925.....	4.33	4.36	4.37	4.35	4.40	4.39	4.36	4.31	4.30	4.36	4.38	4.35	4.39
50	Chic. Milw. & St. Paul Term M 5s 1914.....	4.56	4.48	4.46	4.46	4.46	4.48	4.55	4.47	4.33	4.34	4.31	4.36	4.32
51	Chicago & N. W. Ry. Deb 5s 1910.....	4.55	4.58	4.56	4.42	4.51	4.51	4.57	4.57	4.55	4.53	4.55	4.50	4.42
52	West Shore RR 1st M 4s 2361.....	3.95	3.90	3.88	3.84	3.88	3.88	3.88	3.87	3.86	3.84	3.82	3.83	3.83
53	Chicago & N. W. Ry. 1st M 5s 1933.....	4.64	4.55	4.49	4.47	4.52	4.44	4.45	4.50	4.48	4.47	4.61	4.61	4.60
54	Chicago & North Western ext 4s 1926.....	4.26	4.15	4.08	4.05	4.12	4.16	4.21	4.05	3.99	3.95	3.90	3.93	4.09
55	St. Paul Minn. & Man. cons M 4s 1933.....	4.60	4.59	4.55	4.51	4.53	4.52	4.51	4.50	4.49	4.50	4.49	4.49	4.43
56	Chic. Ind. St. L. & Chi. gen 1st M 4s 1936.....	4.52	4.50	4.51	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41
57	Pacific RR of Mo 1st ext M 4s 1938.....	4.23	4.14	4.08	4.03	4.04	4.10	4.14	4.11	4.05	4.02	4.01	3.97	3.96
58	Illinois Central RR coll 4s 1952.....	4.08	4.04	3.99	3.93	3.93	3.97	3.90	3.97	3.97	4.01	3.97	3.96	3.96
59	Lake Erie & Western 1st M 5s 1937.....	4.45	4.34	4.33	4.34	4.34	4.35	4.31	4.30	4.35	4.29	4.39	4.33	4.32
60	Wabash RR Co 1st M 5s 1939.....	4.90	4.87	4.82	4.76	4.84	4.78	4.84	4.94	4.88	4.81	4.77	4.78	4.78
61	Ches. & Ohio (Ext.) 1st M 6s 1911.....	4.78	4.68	4.59	4.47	4.55	4.60	4.60	4.54	4.45	4.45	4.39	4.47	4.47
62	Roads Co. (Ext.) 1st M 6s 1911.....	4.24	4.21	4.23	4.12	4.12	4.10	4.08	4.10	4.07	4.04	4.02	3.99	4.00
63	N. Y. Chic. & St. Louis 1st M 4s 1937.....	4.77	4.62	4.09	4.04	4.04	4.03	4.06	4.02	4.00	3.97	3.94	3.94	3.89
64	Ches. & Ohio Ry 1st cons 5s 1939.....	4.92	4.83	4.81	4.79	4.78	4.80	4.82	4.74	4.62	4.65	4.61	4.63	4.69
65	Ill. Central (L. N. O. & T.) col 4s 1953.....	4.24	4.27	4.17	4.11	4.07	4.12	4.13	4.10	4.08	4.06	4.07	4.08	4.12

YIELDS OF RAILROAD BONDS
Jan. 1895—Jan. 1896

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
30	Morris & Essex 1st M at 7s 1914.....	3.90	4.09	4.01	3.95	3.98	3.96	3.94	3.91	3.84	3.80	3.75	3.84	3.90
31	Lehigh Valley RR 2nd M reg 7s 1910.....	4.12	4.13	4.11	4.13	4.13	3.96	3.92	3.92	3.97	4.03	4.07	3.94	4.04
32	Ches & Ohio RR 1st M 6s 1915.....	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46
33	Pennsylvania RR Co 1st M 6s 1915.....	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46
34	Chicago Rk Is & Pac RR 1st M 6s 1917.....	4.18	4.19	4.26	4.22	4.18	4.07	4.01	3.95	3.99	4.00	3.91	3.94	4.08
35	St. Paul Minn & Man 2nd M 6s 1909.....	4.45	4.54	4.56	4.58	4.54	4.41	4.30	4.15	4.15	4.30	4.28	4.30	4.54
36	Nash Chatt & St. L 1st M 7s 1913.....	4.45	4.49	4.65	4.67	4.67	4.63	4.57	4.49	4.50	4.50	4.52	4.64	4.70
37	St. P & Sioux City RR 1st M 6s 1919.....	4.20	4.21	4.29	4.37	4.29	4.18	4.10	4.00	3.99	4.08	4.12	4.15	4.21
38	St. M & St. P (So Min Div) 1st M 6s 1910.....	4.47	4.50	4.62	4.61	4.57	4.51	4.43	4.46	4.38	3.98	4.31	4.39	4.70
39	Canada Southern Ry 1st M 3s 1908.....	4.02	4.01	4.10	4.18	4.09	4.02	4.01	4.00	3.98	3.98	4.03	4.13	4.26
40	Chic St. P Min & Omaha cons M 6s 1930.....	4.61	4.71	4.70	4.65	4.58	4.52	4.48	4.46	4.46	4.51	4.49	4.47	4.58
41	St. P Min & Man (Dak Div) 1st M 6s 1910.....	4.44	4.50	4.50	4.56	4.56	4.19	4.34	4.30	4.30	4.26	4.20	4.16	4.35
42	Philadelphia & Erie gen M 5s 1920.....	3.91	3.98	3.95	3.99	3.92	3.93	3.97	3.99	4.01	3.93	3.93	3.94	4.02
43	C M & St. P (C & P W Div) 1st M 5s 1921.....	4.31	4.39	4.34	4.31	4.28	4.18	4.18	4.06	4.08	4.11	4.15	4.17	4.31
44	C M & St. P (Wis & Min Div) 1st M 5s 1921.....	4.49	4.45	4.49	4.52	4.49	4.47	4.39	4.43	4.27	4.28	4.36	4.48	4.52
45	Chic St. Louis & N Orleans 5s 1951.....	4.26	4.20	4.23	4.25	4.21	4.16	4.21	4.14	4.10	4.12	4.13	4.10	4.24
46	Pennsylvania Co qu 1st M 4½s 1921.....	3.90	3.89	3.90	3.86	3.75	3.65	3.78	3.59	3.71	3.70	3.78	3.79	3.91
47	New York Lack & West 1st M 6s 1921.....	3.97	4.03	4.10	4.09	4.00	3.97	3.97	3.87	3.95	3.99	4.02	4.08	4.13
48	Hannibal & St. Joseph cons M 6s 1911.....	4.44	4.60	4.58	4.67	4.66	4.58	4.55	4.06	4.24	4.22	4.27	4.64	4.63
49	Chic Milw & St. Paul Term M 5s 1914.....	4.32	4.36	4.38	4.29	4.35	4.28	4.22	4.16	4.16	4.16	4.16	4.30	4.24
50	Chicago & N W Ry Deb 5s 1909.....	4.42	4.49	4.50	4.51	4.41	4.49	4.47	4.47	4.56	4.45	4.39	4.77	4.65
51	West Shore RR 1st M 4s 2361.....	3.83	3.86	3.84	3.84	3.84	3.82	3.81	3.78	3.77	3.80	3.79	3.84	3.83
52	Chicago & N W Ry st Deb 5s 1933.....	4.60	4.60	4.58	4.63	4.64	4.52	4.51	4.44	4.48	4.42	4.48	4.56	4.60
53	Chicago & North Western ext 4s 1976.....	4.09	3.99	4.08	4.10	4.05	4.01	3.98	3.92	3.90	3.92	3.95	4.01	4.06
54	St. Paul Minn & Man cons M 4½s 1933.....	4.43	4.47	4.47	4.50	4.43	4.38	4.34	4.29	4.29	4.27	4.23	4.28	4.35
55	Cin Ind St L & Chi gen 1st 4s 1936.....	4.27	4.26	4.29	4.33	4.23	4.25	4.14	4.01	4.02	4.00	4.04	4.17	4.24
56	Pacific RR of Mo.....	3.91	3.91	3.91	3.91	3.91	3.91	3.91	3.91	3.91	3.91	3.91	3.91	3.91
57	Illinois Central RR col 4s 1937.....	3.96	3.99	3.99	3.98	3.92	3.86	3.83	3.74	3.70	3.82	3.95	3.92	3.85
58	Lake Erie & Western 1st M 5s 1937.....	4.32	4.30	4.26	4.30	4.23	4.26	4.22	4.21	4.19	4.18	4.20	4.25	4.31
59	Wabash RR Co 1st M 5s 1939.....	4.78	4.81	4.81	4.78	4.72	4.64	4.66	4.66	4.63	4.65	4.68	4.86	4.86
60	Ches & O (East Ex) 1st M 6s 1911.....	4.47	4.58	4.47	4.55	4.54	4.48	4.48	4.32	4.31	4.35	4.32	4.34	4.47
61	Nomr Water & Ogden cons M 5s 1922.....	4.00	4.05	4.09	4.14	4.05	3.98	3.95	3.95	3.97	3.92	3.93	3.95	4.01
62	Ches & Ohio RR 1st M 6s 1915.....	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46
63	Ches & Ohio RR 2nd M 6s 1915.....	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46	3.46
64	Ill Central (L N O & T) col 4s 1953.....	4.12	4.14	4.14	4.12	4.05	4.02	3.97	3.86	3.85	3.90	3.93	3.94	4.00
65	C & O (R & A Div) 1st cons M 4s 1989.....	4.28	4.38	4.39	4.37	4.28	4.16	4.11	4.15	4.19	4.21	4.22	4.28	4.30
66	C C & St L (St L Div) 1st col 4s 1990.....	4.47	4.46	4.48	4.47	4.42	4.33	4.25	4.26	4.28	4.35	4.33	4.35	4.43
67	E Tenn V & G Ry cons 1st M 5s 1956.....	4.85	4.88	4.84	4.82	4.72	4.61	4.58	4.59	4.57	4.61	4.65	4.68	4.75

YIELDS OF RAILROAD BONDS
JAN. 1896—JAN. 1897

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
30	Morris & Essex 1st M of 7s 1914.....	3.90	4.04	4.00	3.91	3.90	4.06	4.15	4.45	4.28	4.08	3.94	3.92	3.80
39	Lehigh Valley RR 2nd M reg 7s 1910.....	4.03	3.99	4.10	4.00	4.07	4.03	4.09	4.36	4.42	4.46	4.45	4.33	4.21
40	Chic & Nor West Ry cons of 7s 1915.....	4.04	4.06	4.12	4.05	4.11	4.07	4.12	4.56	4.46	4.39	4.17	4.01	3.96
42	Pennsylvania RR Co M 6s 1910.....	3.32	3.33	3.36	3.30	3.38	3.21	3.29	3.30	3.45	3.37	3.30	3.30	3.21
49	Chicago RR 1st & Pac RR 1st M 6s 1917.....	4.08	4.14	4.24	4.21	4.18	4.06	4.18	4.54	4.44	4.36	4.09	3.99	3.97
52	St Paul Minn & Man 2nd M 6s 1909.....	4.56	4.42	4.41	4.39	4.35	4.27	4.31	4.70	4.45	4.46	4.47	4.31	4.25
53	Nash Chatt & St L M 7s 1913.....	4.74	4.77	4.77	4.72	4.66	4.61	4.62	4.83	4.83	4.98	4.74	4.74	4.59
54	St P & Sioux City RR 1st M 6s 1919.....	4.21	4.19	4.16	4.18	4.02	4.08	4.31	4.50	4.31	4.21	4.19	4.17	4.00
56	Canada Southern Ry 1st M 5s 1908.....	4.26	4.17	4.20	4.16	4.18	4.12	4.27	4.45	4.34	4.37	4.24	4.11	4.00
57	Chic St P Min & Omaha cons M 6s 1930.....	4.62	4.61	4.59	4.61	4.57	4.51	4.76	4.97	4.82	4.68	4.60	4.45	4.40
58	St P Min & Man (Dak Dr) 1st M 6s 1910.....	4.35	4.32	4.34	4.35	4.37	4.39	4.50	4.83	4.89	4.70	4.65	4.48	4.39
59	Philadelphia & Erie gen M 5s 1920.....	4.02	3.91	3.91	3.90	3.90	3.95	4.01	4.15	4.07	4.01	3.88	3.89	3.88
60	C M & St P (W & W Dr) 1st M 5s 1921.....	4.31	4.24	4.18	4.19	4.17	4.16	4.28	4.44	4.38	4.24	4.24	4.13	4.19
61	C M & St P (W & Min Dr) 1st M 5s 1921.....	4.32	4.25	4.18	4.21	4.13	4.13	4.25	4.41	4.30	4.16	4.11	4.01	3.98
62	Chic St Louis & N Orleans 5s 1931.....	3.24	3.20	3.15	3.15	3.14	3.13	3.20	3.45	3.30	3.26	3.22	3.17	3.13
63	Pennsylvania Co gu 1st M 4 1/2s 1921.....	3.91	3.82	3.86	3.86	3.81	3.82	3.84	4.11	4.04	3.98	3.90	3.90	3.85
64	New York Lack & West 1st M 6s 1921.....	4.13	3.98	4.03	4.04	4.02	4.00	4.16	4.43	4.19	4.15	4.05	4.00	3.91
65	Hannibal & St Joseph cons M 6s 1911.....	4.63	4.59	4.58	4.55	4.48	4.49	4.60	5.05	4.95	4.76	4.59	4.45	4.35
68	Chic Milw & St Paul Term M 5s 1914.....	4.24	4.12	4.07	4.19	4.17	4.12	4.30	4.56	4.42	4.33	4.18	4.20	4.15
69	Chicago & N W Ry Deb 5s 1909.....	4.65	4.55	4.56	4.59	4.51	4.45	4.58	4.71	4.68	4.80	4.61	4.47	4.42
70	West Shore RR 1st M 4s 2361.....	3.83	3.80	3.81	3.82	3.83	3.82	3.89	3.97	3.91	3.90	3.86	3.80	3.78
71	Chicago & N W Ry 1st Den 5s 1933.....	3.82	3.80	3.81	3.82	3.83	3.82	3.89	3.97	3.91	3.90	3.86	3.80	3.78
72	Chicago & North W Ry 1st M 4s 1926.....	4.06	4.01	3.99	3.99	3.95	3.97	4.08	4.14	4.01	4.11	4.15	4.01	3.98
73	St Paul Minn & Man cons M 4 1/2s 1933.....	4.41	4.34	4.26	4.28	4.31	4.27	4.53	4.71	4.49	4.46	4.39	4.37	4.36
74	Cin Ind St L & Chi gen 1st 4s 1936.....	4.24	4.13	4.15	4.19	4.13	4.09	4.14	4.37	4.33	4.33	4.18	4.20	4.17
75	Pacific RR of Mo 1st ext M 4s 1938.....	3.98	3.96	3.96	3.95	3.94	3.89	3.95	4.01	4.04	4.14	4.09	4.08	4.07
76	Illinois Central RR coll 4s 1952.....	3.87	3.87	3.91	3.93	3.92	3.91	4.00	4.16	4.09	4.02	3.89	3.92	3.96
77	Lake Erie & Western 1st M 5s 1937.....	4.31	4.27	4.26	4.25	4.24	4.23	4.26	4.42	4.42	4.36	4.30	4.22	4.26
78	Wabash RR Co 1st M 5s 1939.....	4.86	4.78	4.72	4.69	4.69	4.71	4.84	5.02	4.91	4.88	4.76	4.70	4.69
79	Ches & O (East Ex) 1st M 6s 1911.....	4.47	4.52	4.60	4.60	4.53	4.44	4.72	4.67	4.67	4.52	4.31	3.96	4.54
80	Rome Water & Ordona cons M 5s 1922.....	4.01	3.98	4.00	3.99	4.01	3.99	4.09	4.17	4.03	4.03	4.00	3.99	3.92
81	N Y Chic & St Louis 1st M 4s 1937.....	3.91	3.86	3.86	3.85	3.86	3.86	3.90	4.00	3.99	3.88	3.86	3.86	3.82
82	Ches & Ohio Ry 1st cons 5s 1939.....	4.70	4.62	4.66	4.61	4.59	4.66	4.85	4.99	4.85	4.79	4.63	4.58	4.58
83	Ill Central (L N O & T) col 4s 1953.....	4.06	4.00	4.00	4.00	4.00	4.02	4.05	4.16	4.06	4.09	3.98	4.04	3.97
84	C & O (R & A Dr) 1st cons M 4s 1989.....	4.30	4.21	4.24	4.24	4.20	4.20	4.24	4.37	4.33	4.31	4.21	4.15	4.05
85	C C & St L (St L Dr) 1st col 4s 1990.....	4.35	4.33	4.33	4.34	4.32	4.34	4.39	4.50	4.54	4.45	4.33	4.35	4.35
86	E Tenn V & G Ry cons 1st M 5s 1956.....	4.75	4.70	4.67	4.68	4.66	4.67	4.87	5.00	4.87	4.79	4.66	4.67	4.66

YIELDS OF RAILROAD BONDS
Jan. 1897—Jan. 1898

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
30	Morris & Essex 1st M of 1914	3.80	3.72	3.72	3.72	3.64	3.57	3.60	3.69	3.59	3.63	3.63	3.63	3.62
39	Celleg & Valley RR 2nd M of 1910	4.21	4.45	4.06	4.13	4.17	4.17	3.93	3.75	3.70	3.70	3.84	3.81	3.89
40	Chic & N. W. RR 1st M of 1915	3.96	3.89	3.85	3.73	3.67	3.67	3.55	3.65	3.69	3.63	3.63	3.66	3.63
41	Pennsylvania RR Co. 6th M of 1910	3.21	3.28	3.19	3.23	3.22	3.18	3.18	3.17	3.08	3.12	3.12	3.10	3.12
42	Pennsylvania RR Co. 6th M of 1910	3.97	3.94	3.90	3.84	3.87	3.77	3.75	3.74	3.74	3.77	3.81	3.72	3.72
49	Chicago RR 1st & Pac RR 1st M of 1917	4.59	4.56	4.50	4.62	4.55	4.46	4.35	4.41	4.47	4.44	4.35	4.30	4.29
53	Nash Chatt & St. L 1st M of 1913	4.03	4.02	4.01	3.98	3.98	3.91	3.78	3.85	3.95	4.01	3.92	3.89	3.87
54	St. P & Sioux City RR 1st M of 1919	4.40	4.38	4.35	4.38	4.32	4.22	4.22	4.26	4.30	4.25	4.15	4.07	3.99
56	Canada Southern Ry 1st M of 1918	4.40	4.38	4.35	4.38	4.32	4.22	4.22	4.26	4.30	4.25	4.15	4.07	3.99
57	Chic St. P. Min. & Omaha cons M of 1930	3.88	3.89	3.94	3.91	3.91	3.88	3.85	3.87	3.86	3.88	3.82	3.85	3.77
59	Philadelphia & Erie gen M of 1920	3.88	3.89	3.94	3.91	3.91	3.88	3.85	3.87	3.86	3.88	3.82	3.85	3.77
60	C M & St. P (C & P W Dv) 1st M of 1921	4.19	4.15	4.13	4.08	4.07	4.02	3.96	4.04	4.07	4.07	4.03	3.97	3.93
61	C M & St. P (Wis & Min Dv) 1st M of 1921	4.32	4.29	4.23	4.21	4.20	4.20	4.21	4.27	4.20	4.17	4.11	4.10	4.05
62	Chic St. Louis & N Orleans 5th M of 1911	4.13	4.07	4.04	4.03	4.05	4.01	3.96	4.00	4.02	4.05	4.01	3.97	3.93
63	Pennsylvania Co. 6th M of 1910	3.85	3.86	3.86	3.82	3.80	3.75	3.70	3.76	3.72	3.73	3.67	3.65	3.67
64	New York Lack & West 1st M of 1921	3.91	3.83	3.76	3.73	3.73	3.65	3.58	3.57	3.61	3.64	3.61	3.55	3.54
65	Hannibal & St. Joseph cons M of 1911	4.35	4.35	4.30	4.14	4.15	4.16	4.09	4.16	4.17	4.17	4.06	4.01	3.99
68	Chic Milw & St. Paul Term M of 1914	4.15	4.09	4.11	4.04	4.02	4.00	3.99	4.00	4.00	4.00	4.00	3.94	3.85
69	Chicago & N. W. Ry Deb 5th 1909	4.42	4.42	4.36	4.25	4.21	4.09	4.12	4.13	4.12	4.20	4.11	4.01	4.02
70	West Shore RR 1st M of 1931	3.78	3.75	3.78	3.73	3.73	3.71	3.66	3.71	3.73	3.73	3.67	3.65	3.67
71	Chicago & N. W. Ry sf. Deb 5th 1933	4.43	4.42	4.42	4.37	4.26	4.15	4.13	4.14	4.17	4.20	4.17	4.12	4.11
72	Chicago & North Western ext 4th 1926	3.98	3.87	3.86	3.85	3.83	3.83	3.78	3.79	3.74	3.77	3.75	3.73	3.71
73	St. Paul Min. & N. W. cons M of 1933	4.36	4.34	4.24	4.24	4.24	4.23	4.23	4.21	4.23	4.23	4.22	4.18	4.14
74	Chic St. P. Min. & Omaha cons M of 1936	4.17	4.02	3.98	3.97	3.97	3.97	3.99	4.00	3.99	3.99	4.00	3.94	3.92
75	Pacific RR of Mo. 1st ext. M of 1938	4.07	3.94	3.98	4.02	4.04	3.96	3.94	3.96	3.98	3.99	3.97	3.88	3.82
76	Illinois Central RR col 4th 1932	3.96	3.90	3.89	3.93	3.94	3.95	3.89	3.89	3.93	3.89	3.94	3.88	3.92
77	Lake Erie & Western 1st M of 1937	4.26	4.27	4.25	4.23	4.26	4.21	4.21	4.22	4.21	4.24	4.21	4.20	4.17
78	Wabash RR Co 1st M of 1939	4.69	4.70	4.79	4.89	4.90	4.86	4.78	4.72	4.72	4.73	4.71	4.71	4.68
79	Ches & O (East Ext) 1st M of 1911	3.34	3.29	3.26	3.33	3.33	3.31	3.28	3.33	3.35	3.31	3.32	3.26	3.18
80	Rome Water & Ogden cons M of 1927	3.82	3.81	3.80	3.80	3.79	3.78	3.78	3.83	3.85	3.81	3.82	3.76	3.70
81	N. Y. Chic & St. Louis 1st M of 1931	3.82	3.81	3.80	3.80	3.79	3.80	3.78	3.77	3.75	3.81	3.77	3.71	3.71
82	Ches & Ohio Ry 1st cons 5th 1939	4.58	4.54	4.54	4.51	4.50	4.49	4.49	4.48	4.45	4.48	4.42	4.35	4.29
83	Ill Central (L N O & T) col 4th 1933	3.97	4.00	4.00	4.05	3.97	3.95	3.97	3.97	3.97	4.00	4.03	4.03	3.96
84	C & O (R & A Dv) 1st cons M of 1989	4.05	4.00	3.93	3.97	3.97	3.95	3.87	3.93	3.98	3.99	3.98	3.85	3.83
85	C C C & St. L (St L Dv) 1st col 4th 1990	4.35	4.36	4.28	4.25	4.23	4.27	4.25	4.38	4.25	4.38	4.25	4.26	4.17
86	E Tenn V & G Ry cons 1st M of 1956	4.66	4.65	4.65	4.64	4.63	4.61	4.57	4.53	4.58	4.58	4.57	4.53	4.54
87	Chic Milw & St. Paul gen M of 1989	4.11	4.07	3.99	3.99	4.00	3.96	3.91	3.91	3.92	3.90	3.87	3.84	3.81

VIELDS OF RAILROAD BONDS

Jan. 1898—Jan. 1899

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
30	Morris & Essex 1st M 7s 1914.....	3.62	3.74	3.87	3.90	3.81	3.72	3.75	3.77	3.77	3.73	3.45	3.45	3.41
39	Lehigh Valley RR 2nd M reg 7s 1910.....	3.89	3.75	4.01	4.14	4.31	4.05	4.07	4.07	3.77	3.92	3.97	3.91	3.82
40	Chic & Nor West Ry cons 1st 7s 1915.....	3.63	3.64	3.76	3.75	3.87	3.85	3.70	3.61	3.65	3.63	3.59	3.46	3.50
42	Pennsylvania RR Co gen M 6s 1910.....	3.12	3.07	3.10	3.24	3.26	3.24	2.97	3.08	3.16	3.17	3.17	3.12	3.04
49	Chicago RR 1st & Pac RR 1st M 6s 1917.....	3.72	3.75	3.83	3.78	3.87	3.83	3.80	3.74	3.78	3.75	3.76	3.65	3.63
53	Nash Chatt & St L 1st M 7s 1913.....	4.29	4.28	4.40	4.41	4.46	4.42	4.41	4.33	4.36	4.28	4.27	4.24	4.06
54	St P & Sioux City RR 1st M 6s 1919.....	3.87	3.90	4.00	4.11	4.04	3.94	3.90	3.89	3.89	3.83	3.77	3.72	3.62
57	Chic St P Min & Omaha cons M 6s 1930.....	3.99	4.01	4.17	4.54	4.20	4.10	4.02	4.03	4.10	4.11	4.03	4.05	4.02
59	Philadelphia & Erie gen M 5s 1920.....	3.77	3.77	3.79	3.82	3.84	3.69	3.79	3.82	3.87	3.82	3.82	3.78	3.79
60	C M & St P (C & P W Dr) 1st M 5s 1921.....	3.93	3.93	4.02	4.21	4.13	4.01	3.96	3.91	3.91	3.91	3.89	3.77	3.65
61	C M & St P (Wis & Min Dr) 1st M 5s 1921.....	4.05	4.05	4.18	4.31	4.28	4.21	4.16	4.12	4.12	4.04	3.92	3.87	3.82
62	Chic St Louis & N Orleans 5s 1931.....	3.97	3.98	4.11	4.31	4.22	4.09	4.03	3.99	3.98	3.98	3.96	3.97	3.97
63	Pennsylvania Co gen 1st M 4½s 1921.....	3.54	3.70	3.82	3.99	3.96	3.80	3.68	3.69	3.70	3.66	3.61	3.61	3.44
64	New York Lack & West 1st M 6s 1921.....	3.65	3.60	3.62	3.64	3.65	3.62	3.63	3.61	3.64	3.63	3.60	3.57	3.53
65	Hambilt & St Joseph cons M 6s 1911.....	3.99	4.01	4.05	4.12	4.06	4.14	4.04	3.95	3.98	3.97	3.94	3.91	3.86
68	Chic Milw & St Paul Term M 5s 1914.....	3.85	3.81	3.85	4.11	4.06	4.01	3.98	3.95	3.95	3.94	3.90	3.86	3.78
69	Chicago & N W Ry Deb 5s 1909.....	4.02	4.05	4.26	4.34	4.14	4.09	4.11	4.10	4.12	4.10	4.04	3.94	3.86
70	West Shore RR 1st M 4s 2361.....	3.67	3.66	3.71	3.84	3.78	3.72	3.69	3.67	3.68	3.67	3.64	3.63	3.58
71	Chicago & N W Ry 1st Deb 5s 1933.....	4.11	4.12	4.16	4.29	4.21	4.15	4.09	4.05	4.06	4.03	3.98	3.93	3.87
72	Chicago & North Western ext 4s 1926.....	3.77	3.72	3.79	3.86	3.81	3.79	3.73	3.73	3.74	3.71	3.72	3.73	3.72
73	St Paul Minn & Man cons M 4½s 1933.....	4.14	4.09	4.15	4.27	4.27	4.20	4.11	4.07	4.08	4.02	3.91	3.88	3.83
75	Pacific RR of Mo 1st ext M 4s 1938.....	3.82	3.82	3.92	3.89	3.98	3.89	3.90	3.82	3.82	3.79	3.76	3.80	3.72
76	Illinois Central RR coll 4s 1952.....	3.92	3.98	3.96	3.94	3.98	3.93	3.91	3.89	3.90	3.90	3.89	3.84	3.78
77	Late Erie & Western 1st M 5s 1937.....	4.17	4.17	4.21	4.31	4.29	4.23	4.20	4.18	4.20	4.21	4.19	4.13	4.11
78	Wabash RR Co 1st M 5s 1939.....	4.61	4.59	4.76	4.76	4.76	4.53	4.51	4.46	4.48	4.44	4.39	4.38	4.31
79	Ches & O (East Ext) 1st M 6s 1911.....	4.15	4.19	4.30	4.31	4.17	4.38	4.14	4.12	4.13	4.06	4.08	4.05	4.02
80	Rome Water & Ordens cons M 5s 1922.....	3.70	3.72	3.80	3.85	3.77	3.70	3.63	3.59	3.57	3.49	3.25	3.25	3.20
81	N Y Chic & St Louis 1st M 4s 1937.....	3.71	3.75	3.88	3.96	3.85	3.82	3.78	3.76	3.77	3.77	3.75	3.73	3.70
82	Ches & Ohio Ry 1st cons 5s 1939.....	4.29	4.26	4.37	4.43	4.37	4.30	4.29	4.27	4.30	4.29	4.19	4.17	4.13
83	Ill Central (L N O & T) col 4s 1953.....	3.96	3.96	4.03	4.15	4.04	3.99	3.96	3.97	3.99	3.98	3.95	3.92	3.88
84	C & O (R & A Dr) 1st cons M 4s 1989.....	3.83	3.84	3.89	3.96	3.98	3.89	3.89	3.84	3.94	3.88	3.82	3.82	3.80
85	C C & St L (St L Dr) 1st col 4s 1990.....	4.17	4.14	4.21	4.30	4.37	4.27	4.21	4.06	4.09	4.09	4.09	4.07	3.97
86	E Tenn V & G Ry cons 1st M 5s 1956.....	4.54	4.54	4.62	4.70	4.60	4.57	4.48	4.46	4.46	4.43	4.41	4.34	4.32
87	Chic Milw & St Paul gen M 4s 1989.....	3.81	3.77	3.82	3.90	3.87	3.81	3.78	3.82	3.82	3.83	3.78	3.75	3.62
88	Lake Sh & Mich So 1st M 3½s 1997.....	3.52	3.51	3.58	3.47	3.41	3.35	3.37	3.34	3.32	3.32	3.31	3.29	3.28

YIELDS OF RAILROAD BONDS
JAN. 1899—JAN. 1900

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
30	Morris & Essex 1st M of 7s 1914.....	3.41	3.50	3.50	3.44	3.38	3.44	3.49	3.55	3.57	3.60	3.62	3.66	3.61
39	Lehigh Valley RR 2nd M reg 7s 1910.....	3.82	3.96	3.79	3.82	3.77	3.77	3.70	3.66	3.03	3.87	3.98	4.07	4.00
40	Chic & Nor West Ry cons of 7s 1915.....	3.50	3.45	3.52	3.51	3.44	3.40	3.46	3.40	3.36	3.40	3.40	3.50	3.51
49	Chicago Rk is & Pac RR 1st M 6s 1917.....	3.63	3.63	3.62	3.59	3.55	3.51	3.46	3.53	3.61	3.71	3.80	3.76	3.62
53	Nash Chatt & St L 1st M 7s 1913.....	4.06	4.07	4.15	4.16	4.11		4.08	4.09	4.25	4.29	4.32	4.45	4.31
54	St P & Sioux City RR 1st M 6s 1919.....	3.72	3.80	3.79	3.79	3.78	3.76	3.77	3.80	3.87	3.87	3.92	4.00	4.01
57	Chic St P Min & Omaha cons M 6s 1930.....	4.00	3.98	3.99	3.96	3.91	3.90	3.93	3.93	3.95	3.98	4.04	4.03	4.14
60	C M & St P (C & P W Dv) 1st M 5s 1921.....	3.65	3.64	3.69	3.63	3.59	3.58	3.56	3.58	3.64	3.71	3.70	3.75	3.67
62	Chic St Louis & N Orleans 5s 1931.....	3.97	3.86	3.86	3.83	3.83	3.79	3.78	3.80	3.87	3.84	3.93	3.95	3.92
63	Pennsylvania Co gu 1st M 4 1/2s 1921.....	3.44	3.56	3.55	3.49	3.46	3.45	3.46	3.47	3.53	3.61	3.64	3.68	3.69
64	New York Lead & West 1st M 6s 1921.....	3.53	3.54	3.53	3.37	3.38	3.41	3.49	3.50	3.52	3.55	3.56	3.61	3.56
70	West Shore RR 1st M 4s 2361.....	3.59	3.58	3.56	3.54	3.54	3.50	3.49	3.51	3.58	3.58	3.57	3.63	3.58
71	Chicago & N W Ry of Deb 5s 1933.....	3.87	3.92	3.92	3.89	3.86	3.83	3.86	3.87	3.92	3.98	4.03	4.12	4.05
73	St Paul Minn & Man cons M 4 1/2s 1933.....	3.83	3.83	3.88	3.71	3.61	3.62	3.62	3.68	3.71	3.75	3.79	3.78	3.80
75	Pacific RR of Mo 1st ext M 4s 1938.....	3.72	3.72	3.69	3.67	3.65	3.64	3.66	3.66	3.68	3.71	3.73	3.84	3.80
76	Illinois Central RR coll 4s 1952.....	3.78	3.77	3.86	3.78	3.77	3.76	3.79	3.83	3.88	3.94	3.98	3.90	3.87
77	Chicago & West 1st M 4s 1937.....	3.11	3.10	3.10	3.06	3.01	3.06	3.09	3.10	3.10	3.10	3.10	3.10	3.10
78	Wabash RR C cons M 5s 1939.....	4.31	4.29	4.31	4.25	4.21	4.16	4.19	4.21	4.30	4.29	4.27	4.32	4.30
80	Rome Water & Ogden cons M 5s 1922.....	3.20	3.22	3.22	3.26	3.27	3.29	3.28	3.31	3.34	3.36	3.48	3.28	3.29
81	N Y Chic & St Louis 1st M 4s 1937.....	3.71	3.71	3.72	3.68	3.69	3.68	3.68	3.66	3.72	3.74	3.73	3.77	3.76
82	Ches & Ohio Ry 1st cons 5s 1939.....	4.13	4.13	4.13	4.11	4.05	4.04	4.09	4.10	4.14	4.17	4.17	4.24	4.21
83	Ill Central (L N O & T) coll 4s 1953.....	3.88	3.76	3.86	3.77	3.77	3.81	3.85	3.80	3.85	3.89	4.03	3.96	3.96
84	C O & St L cons M 4s 1930.....	3.78	3.76	3.77	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75	3.75
85	C O & St L (St L Dv) cons M 4s 1930.....	3.97	3.95	3.99	3.97	3.96	3.96	3.94	3.90	3.97	3.94	3.94	4.00	3.96
86	E Tenn V & G Ry cons 1st M 5s 1956.....	4.32	4.34	4.29	4.24	4.20	4.22	4.17	4.17	4.23	4.27	4.26	4.34	4.31
87	Chic Mthw & St Paul gen M 4s 1989.....	3.62	3.58	3.61	3.56	3.53	3.53	3.56	3.55	3.59	3.62	3.64	3.66	3.64
88	Lake Sh & Mich So 1st M 3 1/2s 1997.....	3.28	3.25	3.21	3.18	3.14	3.14	3.17	3.19	3.21	3.24	3.20	3.18	3.18
89	St P Min & Man (Mon Ex) 1st M 4s 1937.....	3.77	3.76	3.77	3.71	3.65	3.60	3.73	3.78	3.86	3.92	3.82	3.90	3.84
90	Baltimore & Ohio RR 1st M 4s 1947.....	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70
91	Union Pac RR 1st M RR & Ig 4s 1947.....	3.78	3.83	3.83	3.78	3.73	3.73	3.75	3.78	3.83	3.86	3.88	3.93	3.85
92	Chicago & Nor West gen M 3 1/2s 1987.....	3.42	3.38	3.36	3.29	3.21	3.18	3.20	3.21	3.23	3.25	3.23	3.26	3.28
93	Chi Rock Is & Pac Ry gen M 4s 1988.....	3.76	3.75	3.76	3.72	3.67	3.69	3.73	3.74	3.77	3.78	3.82	3.85	3.82
94	Atch Top & Santa Fe gen M 4s 1995.....	3.98	3.98	3.97	3.97	3.94	3.92	3.96	3.97	3.98	4.05	4.06	4.16	4.05
95	N Y Cent & Hudson River M 3 1/2s 1997.....	3.13	3.13	3.12	3.12	3.13	3.12	3.15	3.16	3.17	3.18	3.18	3.20	3.20

YIELDS OF RAILROAD BONDS
JAN. 1900—JAN. 1901

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
40	Chic & Nor West Ry cons of 7s 1915.....	3.51	3.53	3.43	3.44	3.45	3.46	3.53	3.50	3.55	3.57	3.65	3.59	3.55
49	Chicago Rk Is & Pac RR 1st M 6s 1917.....	3.62	3.56	3.51	3.55	3.60	3.66	3.70	3.68	3.69	3.70	3.66	3.64	3.58
53	Nash Chatt & St L 1st M 7s 1913.....	4.31	4.25	4.31	4.33	4.44	4.46	4.35	4.24	4.33	4.31	4.24	4.19	4.12
54	St P & Sioux City RR 1st M 6s 1919.....	4.01	3.93	3.86	3.79	3.86	3.80	3.84	3.85	3.84	3.82	3.81	3.81	3.81
57	Chic St P Min & Omaha cons M 6s 1930.....	4.14	4.06	4.05	4.03	4.08	4.10	4.15	4.13	4.12	4.09	4.08	4.02	4.01
60	C M & St P (C & P W Dv) 1st M 5s 1921.....	3.67	3.66	3.64	3.61	3.67	3.72	3.72	3.71	3.75	3.77	3.69	3.64	3.60
62	Chic St Louis & N. Orls M 5s 1931.....	3.69	3.67	3.59	3.58	3.69	3.70	3.70	3.71	3.69	3.73	3.69	3.67	3.64
63	Pennsylvania Co gen 1st M 4½s 1921.....	3.69	3.57	3.59	3.51	3.53	3.52	3.40	3.42	3.44	3.50	3.49	3.50	3.51
64	New York Lack & West 1st M 6s 1921.....	3.56	3.54	3.53	3.58	3.61	3.64	3.65	3.69	3.60	3.63	3.63	3.55	3.53
70	West Shore RR 1st M 4s 2361.....	3.58	3.53	3.56	3.54	3.59	3.56	3.58	3.60	3.58	3.58	3.57	3.53	3.51
73	St Paul Minn & Man cons M 4½s 1933.....	3.80	3.73	3.71	3.69	3.72	3.74	3.75	3.78	3.78	3.81	3.73	3.71	3.70
76	Illinois Central RR coll 4s 1952.....	3.87	3.88	3.90	3.91	3.95	3.89	3.91	3.93	3.94	3.93	3.99	3.86	3.86
77	Chic & N. W. Ry 1st M 5s 1937.....	4.06	3.95	3.94	3.92	3.94	3.95	3.99	3.98	3.97	3.91	3.89	3.85	3.86
78	Wabash R. Co M 5s 1918.....	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72	3.72
80	Rome Water & Ogden cons M 5s 1922.....	3.29	3.30	3.35	3.31	3.37	3.39	3.40	3.40	3.35	3.38	3.32	3.33	3.31
81	N Y Chic & St Louis 1st M 4s 1937.....	3.76	3.69	3.68	3.68	3.70	3.71	3.73	3.72	3.72	3.72	3.70	3.65	3.64
82	Ches & Ohio Ry 1st cons 5s 1939.....	4.21	4.13	4.13	4.07	4.14	4.18	4.19	4.20	4.08	4.12	4.00	3.99	4.00
83	Hl Central (L N O & T) col 4s 1953.....	3.96	3.89	3.91	3.89	3.91	3.91	3.97	3.96	3.95	3.93	3.86	3.85	3.85
84	C & O (R & A Dv) 1st cons M 4s 1989.....	3.93	3.96	3.87	3.84	3.87	3.87	3.78	3.81	3.82	3.84	3.85	3.81	3.79
85	C C & St L (St L Dv) 1st col 4s 1990.....	3.96	3.95	3.94	3.92	3.94	3.96	3.95	3.92	3.96	3.91	3.86	3.87	3.85
86	E Tenn V & G Ry cons 1st M 5s 1956.....	4.31	4.24	4.27	4.21	4.22	4.27	4.31	4.33	4.23	4.17	4.23	4.18	4.19
87	Chic Milw & St. Pa. 1st M 4s 1989.....	3.24	3.24	3.27	3.10	3.19	3.19	3.19	3.18	3.23	3.23	3.23	3.22	3.22
88	Lake Sh & Mich So 1st M 3½s 1997.....	3.18	3.18	3.19	3.10	3.19	3.19	3.19	3.18	3.23	3.23	3.23	3.22	3.22
89	St P Min & Man (Mon Ex) 1st M 4s 1937.....	3.84	3.84	3.88	3.85	3.86	3.88	3.87	3.87	3.85	3.89	3.86	3.82	3.85
90	Baltimore & Ohio RR 1st M 4s 1948.....	4.10	4.04	4.01	3.98	4.02	4.03	4.05	4.07	4.07	4.03	4.01	3.99	3.96
91	Union Pac RR 1st M RR & lg 4s 1987.....	3.85	3.81	3.79	3.80	3.82	3.81	3.78	3.78	3.81	3.81	3.78	3.74	3.74
92	Chicago & Nor West gen M 3½s 1947.....	3.28	3.20	3.20	3.19	3.17	3.19	3.20	3.20	3.20	3.25	3.26	3.19	3.19
93	Chi Rock Is & Pac Ry gen M 4s 1988.....	3.82	3.78	3.77	3.75	3.77	3.75	3.74	3.75	3.79	3.79	3.74	3.71	3.68
94	Arch Top & Santa Fe gen M 4s 1995.....	4.05	4.02	3.99	3.99	4.00	4.00	4.00	4.02	4.03	4.01	3.96	3.93	3.93
95	N Y Cent & Hudson River M 3½s 1997.....	3.20	3.24	3.18	3.18	3.19	3.18	3.18	3.19	3.20	3.22	3.20	3.19	3.19
96	Scioto Val & New Eng 1st M 4s 1989.....	4.05	4.19	4.09	4.00	4.00	4.07	4.00	4.00	4.01	3.99	3.95	3.94	3.92
97	Lehigh Valley (N Y) 1st M 4½s 1940.....	4.12	4.09	4.07	4.03	4.14	4.15	4.11	4.08	4.07	4.03	4.01	4.04	4.01
98	Louisville & Nash unlted 4s 1940.....	4.10	4.06	4.08	4.03	4.06	4.09	4.10	4.09	4.10	4.11	4.11	4.03	3.99
99	Oregon RR & Nav Co cons M 4s 1946.....	3.96	3.97	3.89	3.89	3.90	3.91	3.91	3.91	3.95	3.93	3.86	3.86	3.86
100	Chi Bur & Q (Ill Div) M 3½s 1949.....	3.39	3.33	3.33	3.33	3.34	3.38	3.39	3.39	3.40	3.37	3.34	3.34	3.35
101	Central Pacific 1st ref M 4s 1949.....	4.12	4.07	4.07	4.04	4.09	4.09	4.08	4.09	4.11	4.16	4.11	4.02	4.01
102	Nor Pac Ry prior lien lg M 4s 1997.....	3.90	3.88	3.87	3.86	3.87	3.88	3.86	3.88	3.90	3.91	3.87	3.84	3.84

YIELDS OF RAILROAD BONDS
Jan. 1901—Jan. 1902

Bd. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
40	Chic & Nor West Ry cons sf 7s 1915.....	3.55	3.35	3.38	3.31	3.31	3.23	3.31	3.34	3.37	3.40	3.35	3.32	3.32
49	Chicago RR Is & Pac RR 1st M 6s 1917.....	3.58	3.55	3.61	3.65	3.65	3.67	3.73	3.71	3.74	3.71	3.66	3.63	3.58
53	Nash Chatt & St L 1st M 7s 1913.....	4.12	4.17	4.18	4.21	4.21	4.19	4.09	4.23	4.28	4.21	4.15	4.15	4.10
54	St P & Sioux City RR 1st M 6s 1919.....	3.81	3.77	3.73	3.70	3.64	3.70	3.70	3.80	3.85	3.81	3.75	3.77	3.81
57	Chic St P Min & Omaha cons M 6s 1930.....	4.01	3.90	3.79	3.81	3.79	3.80	3.80	3.93	3.87	3.83	3.79	3.73	3.74
60	C M & St P (C & P W Dr) 1st M 5s 1921.....	3.60	3.58	3.58	3.63	3.71	3.74	3.79	3.80	3.80	3.79	3.76	3.76	3.67
62	Chic St Louis & N Orleans 5s 1951.....	3.84	3.84	3.82	3.82	3.84	3.79	3.82	3.82	3.82	3.81	3.77	3.73	3.72
63	Pennsylvania Co gu 1st M 4 1/4s 1921.....	3.51	3.51	3.53	3.56	3.59	3.67	3.65	3.66	3.67	3.66	3.61	3.63	3.62
64	New York Lack & West 1st M 6s 1921.....	3.53	3.51	3.52	3.55	3.56	3.59	3.61	3.60	3.60	3.58	3.54	3.52	3.53
70	West Shore RR 1st M 4s 2361.....	3.51	3.49	3.48	3.51	3.55	3.55	3.57	3.55	3.56	3.58	3.58	3.56	3.56
73	St Paul Minn & Man cons M 4 1/4s 1933.....	3.70	3.69	3.69	3.71	3.75	3.75	3.78	3.77	3.76	3.80	3.71	3.79	3.72
76	Illinois Central RR coll 4s 1952.....	3.66	3.66	3.67	3.68	3.85	3.80	3.81	3.81	3.81	3.80	3.78	3.79	3.78
77	Wabash RR 1st M 5s 1937.....	3.86	3.84	3.85	3.84	3.96	3.94	3.99	3.99	3.96	3.96	3.94	3.94	3.93
78	Wabash RR 2d M 5s 1937.....	4.09	4.09	4.09	4.09	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18	4.18
80	Rome Water & Ogden cons M 5s 1922.....	3.31	3.29	3.27	3.26	3.35	3.33	3.31	3.32	3.25	3.32	3.31	3.31	3.31
81	N Y Chic & St Louis 1st M 4s 1937.....	3.64	3.64	3.64	3.66	3.64	3.66	3.67	3.69	3.70	3.67	3.62	3.66	3.68
82	Ches & Ohio Ry 1st cons Ss 1939.....	4.00	3.99	4.00	4.01	4.00	3.99	4.01	4.00	4.01	4.01	4.00	4.01	3.99
83	Ill Central (L N O & T) col 4s 1953.....	3.85	3.84	3.83	3.82	3.90	3.85	3.86	3.85	3.84	3.83	3.79	3.79	3.79
84	C & O (R & A Dr) 1st cons M 4s 1989.....	3.79	3.78	3.78	3.77	3.85	3.82	3.84	3.86	3.91	3.90	3.87	3.86	3.84
85	C C & St L (St L Dr) 1st col 4s 1990.....	3.85	3.86	3.86	3.86	3.86	3.90	3.87	3.91	3.93	3.95	3.88	3.86	3.89
86	E Tenn V & G Ry cons 1st M 5s 1956.....	4.19	4.15	4.16	4.16	4.19	4.17	4.15	4.19	4.20	4.20	4.16	4.12	4.11
87	Chic Milw & St Paul gen M 4s 1989.....	3.52	3.51	3.50	3.50	3.61	3.61	3.61	3.63	3.64	3.64	3.63	3.63	3.54
88	Lake Sh & Mich So 1st M 3 1/4s 1997.....	3.20	3.20	3.20	3.20	3.21	3.21	3.21	3.21	3.21	3.21	3.21	3.23	3.22
89	St P Min & Man (Mon Ex) 1st M 4s 1937.....	3.85	3.79	3.74	3.73	3.84	3.75	3.76	3.75	3.74	3.85	3.78	3.73	3.70
90	Baltimore & Ohio RR 1st M 4s 1948.....	3.96	3.91	3.89	3.91	3.99	3.88	3.90	3.91	3.92	3.91	3.87	3.89	3.88
91	Union Pac RR 1st M RR & lg 4s 1947.....	3.74	3.74	3.76	3.79	3.81	3.79	3.81	3.80	3.81	3.80	3.79	3.80	3.79
92	Chicago & Nor West gen M 3 1/4s 1987.....	3.19	3.19	3.20	3.20	3.22	3.20	3.21	3.20	3.19	3.18	3.18	3.20	3.20
93	Chi Rock Is & Pac Ry gen M 4s 1988.....	3.68	3.66	3.70	3.72	3.74	3.75	3.74	3.75	3.79	3.79	3.79	3.80	3.70
94	Rich Top & Santa Fe gen M 4s 1985.....	3.93	3.92	3.91	3.91	3.91	3.87	3.89	3.91	3.90	3.89	3.90	3.90	3.90
95	N Y Cent & Hudson River M 5 1/2s 1997.....	3.19	3.19	3.17	3.13	3.19	3.21	3.21	3.23	3.25	3.21	3.21	3.21	3.21
96	Sotom Val & New Eng 1st M 4s 1989.....	3.92	3.95	3.93	3.93	3.92	3.95	4.01	4.00	4.00	3.95	3.94	3.96	3.96
97	Lehigh Valley (N Y) 1st M 4 1/4s 1940.....	4.01	3.99	3.99	4.00	4.03	4.02	4.03	4.03	4.02	4.02	4.05	4.04	4.02
98	Louisville & Nash unified 4s 1940.....	3.90	3.97	3.95	3.91	3.92	3.90	3.93	3.95	3.96	3.98	3.96	3.95	3.96
99	Oregon RR & Nav Co cons M 4s 1946.....	3.86	3.83	3.85	3.85	3.89	3.84	3.91	3.91	3.92	3.91	3.90	3.90	3.89
100	Chi Bur & Q (Ill Div) M 3 1/4s 1949.....	3.35	3.36	3.36	3.36	3.37	3.41	3.40	3.41	3.41	3.42	3.41	3.39	3.41
101	Central Pacific 1st ref M 4s 1949.....	4.01	3.97	3.97	3.99	4.01	3.98	3.95	3.96	3.98	3.95	3.94	3.96	3.91
102	Nor Pac Ry prior lien lg M 4s 1997.....	3.84	3.83	3.83	3.81	3.82	3.83	3.88	3.87	3.87	3.85	3.85	3.85	3.84

YIELDS OF RAILROAD BONDS
JAN. 1902—JAN. 1903

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
40	Chic & Nor West Ry cons 7s 1915.....	3.32	3.33	3.44	3.39	3.36	3.45	3.57	3.55	3.56	3.54	3.55	3.60	3.69
49	Chicago Rk Is & Pac RR 1st M 4s 1917.....	3.58	3.52	3.49	3.49	3.47	3.51	3.53	3.48	3.63	3.66	3.75	3.85	3.95
53	Utah Chmt & St L RR 1st M 6s 1919.....	3.81	3.80	3.79	3.79	3.78	3.77	3.80	3.82	3.85	3.87	3.89	3.96	3.94
54	St P & P M & Omaha cons M 6s 1930.....	3.74	3.74	3.76	3.74	3.74	3.78	3.78	3.83	3.85	3.87	3.89	3.93	3.89
57	Chic St P Min & Omaha cons M 6s 1930.....	3.67	3.56	3.55	3.52	3.58	3.60	3.68	3.71	3.70	3.68	3.69	3.71	3.70
60	C M & St P (C & P W Dv) 1st M 5s 1921.....	3.72	3.72	3.71	3.71	3.72	3.83	3.82	3.82	3.81	3.83	3.84	3.82	3.86
62	Chic St Louis & N Orleans 5s 1951.....	3.72	3.72	3.71	3.71	3.72	3.83	3.82	3.82	3.81	3.83	3.84	3.82	3.86
63	Pennsylvania Co gen 1st M 4 1/2s 1911.....	3.72	3.72	3.71	3.71	3.72	3.83	3.82	3.82	3.81	3.83	3.84	3.82	3.86
64	New York Lack & West 1st M 6s 1921.....	3.72	3.72	3.71	3.71	3.72	3.83	3.82	3.82	3.81	3.83	3.84	3.82	3.86
70	West Shore RR 1st M 4s 2361.....	3.56	3.57	3.56	3.56	3.54	3.53	3.51	3.52	3.53	3.56	3.58	3.61	3.63
73	St Paul Minn & Man cons M 4 1/2s 1933.....	3.72	3.76	3.77	3.75	3.76	3.79	3.81	3.81	3.81	3.88	3.89	3.90	3.89
76	Illinois Central RR coll 4s 1932.....	3.78	3.78	3.77	3.77	3.73	3.74	3.79	3.83	3.84	3.87	3.89	3.89	3.89
77	Lake Erie & Western 1st M 5s 1937.....	3.93	3.90	3.91	3.92	3.96	3.91	3.90	3.91	3.94	3.97	3.97	4.06	3.95
78	Wabash RR Co 1st M 5s 1939.....	4.09	4.09	4.09	4.07	3.90	4.01	4.03	4.06	4.09	4.09	4.11	4.20	4.15
80	Rome Water & Ogden cons M 5s 1922.....	3.51	3.28	3.30	3.36	3.41	3.45	3.50	3.58	3.60	3.63	3.58	3.58	3.56
81	N Y Chic & St Louis 1st M 4s 1937.....	3.68	3.70	3.70	3.69	3.72	3.75	3.74	3.72	3.74	3.76	3.79	3.79	3.83
82	Ches & Ohio Ry 1st cons 5s 1939.....	3.99	4.00	3.99	3.94	3.97	3.99	3.99	4.01	4.05	4.08	4.05	4.10	4.05
83	Ill Central (L N O & T) col 4s 1953.....	3.79	3.83	3.81	3.84	3.85	3.82	3.84	3.87	3.84	3.87	3.85	3.90	3.91
84	C & O (R & A Dv) 1st cons M 4s 1980.....	3.84	3.83	3.83	3.84	3.86	3.87	3.89	3.89	3.92	3.93	3.92	3.95	3.94
85	C C & St L (St L Dv) 1st col 4s 1990.....	3.89	3.90	3.88	3.88	3.88	3.87	3.91	3.94	3.93	3.95	3.94	3.93	3.94
86	E Tenn V & G Ry cons 1st M 5s 1956.....	4.11	4.07	4.08	4.06	4.04	4.04	4.07	4.06	4.06	4.13	4.16	4.16	4.15
87	Chic Mv & St Pac RR 1st M 4s 1989.....	3.54	3.51	3.47	3.45	3.45	3.45	3.49	3.52	3.54	3.55	3.56	3.57	3.57
88	Lake Sh & Mich So 1st M 3 1/2s 1997.....	3.22	3.22	3.25	3.24	3.24	3.25	3.27	3.26	3.29	3.34	3.37	3.34	3.33
89	St P Min & Man (Mon Ex) 1st M 4s 1937.....	3.70	3.70	3.70	3.70	3.70	3.70	3.71	3.72	3.74	3.81	3.81	3.83	3.83
90	Baltimore & Ohio RR 1st M 4s 1948.....	3.88	3.89	3.89	3.88	3.91	3.91	3.91	3.90	3.89	3.97	3.99	3.97	3.95
91	Union Pac RR 1st M RR & Ig 4s 1947.....	3.79	3.76	3.77	3.77	3.81	3.79	3.80	3.79	3.81	3.85	3.83	3.88	3.85
92	Chicago & North Western M 4s 1988.....	3.70	3.70	3.71	3.70	3.71	3.70	3.70	3.70	3.70	3.70	3.71	3.71	3.71
93	Chic Mv & St Pac RR 1st M 4s 1989.....	3.70	3.70	3.71	3.70	3.71	3.70	3.70	3.70	3.70	3.70	3.71	3.71	3.71
94	Arch Top & Santa Fe gen M 4s 1995.....	3.90	3.90	3.87	3.87	3.89	3.90	3.89	3.90	3.91	3.96	3.96	3.97	3.95
95	N Y Cent & Hudson River M 3 1/2s 1997.....	3.21	3.21	3.22	3.22	3.25	3.26	3.27	3.27	3.24	3.30	3.36	3.36	3.36
96	Scioto Val & New Eng 1st M 4s 1989.....	3.96	3.95	3.91	3.92	3.91	3.94	3.95	3.94	3.96	3.98	3.98	3.98	4.00
97	Lehigh Valley (N Y) 1st M 4 1/2s 1940.....	4.02	4.00	4.01	3.99	4.01	4.01	4.00	4.01	4.01	4.10	4.12	4.15	4.08
98	Louisville & Nash unfrd 4s 1946.....	3.96	3.95	3.92	3.92	3.92	3.94	3.94	3.94	3.96	4.00	4.00	4.02	3.98
99	Oregon RR & N Co cons M 4s 1946.....	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99	3.99
100	Chi Bur & Q (H Dv) M 3 1/2s 1949.....	3.41	3.41	3.41	3.41	3.43	3.47	3.51	3.55	3.58	3.58	3.61	3.63	3.66
101	Central Pacific 1st ref M 4s 1949.....	3.91	3.93	3.93	3.94	3.95	3.93	3.95	3.97	4.00	4.01	4.00	4.00	4.01
102	Nor Pac Ry prior lien M 4s 1997.....	3.84	3.83	3.82	3.82	3.84	3.85	3.86	3.87	3.88	3.90	3.91	3.91	3.89
103	Nor & West Ry 1st cons M 4s 1996.....	3.94	3.91	3.93	3.93	3.95	3.96	3.98	3.97	3.94	3.97	4.00	4.04	4.01

YIELDS OF RAILROAD BONDS
JAN. 1903—JAN. 1904

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
40	Chic & Nor West Ry cons sf 7s 1915.....	3.69	3.65	3.77	3.78	3.72	3.68	3.90	3.75	3.75	3.72	3.71	3.72	3.73
54	St P & Sioux City RR 1st M 6s 1919.....	3.94	3.96	4.00	4.03	4.00	4.04	4.08	4.16	4.19	4.16	4.16	4.21	4.22
57	Chic St P Min & Omaha cons M 6s 1930.....	3.89	3.90	4.06	4.11	4.11	4.15	4.07	4.28	4.09	4.08	4.08	4.11	4.10
60	C M & St P (C & P W Dv) 1st M 5s 1921.....	3.70	3.76	3.82	3.82	3.83	3.86	3.91	4.08	3.98	3.85	3.82	3.87	3.79
63	Pennsylvania Co gu 1st M 4½s 1921.....	3.81	3.85	3.82	3.97	3.92	3.92	3.90	3.94	3.93	3.82	3.81	3.81	3.84
64	New York Lack & West 1st M 6s 1921.....	3.68	3.67	3.69	3.69	3.71	3.77	3.84	3.93	3.92	3.87	3.82	3.79	3.84
65	West Shore Lack & W 4s 2½s 1921.....	3.63	3.63	3.65	3.69	3.69	3.69	3.73	3.72	3.77	3.77	3.76	3.75	3.71
73	St Paul Min & RR cons M 4½s 1933.....	3.89	3.90	3.94	4.01	3.98	4.01	4.10	4.07	4.08	4.08	3.99	4.05	3.98
76	Illino Central RR cons M 4½s 1933.....	3.89	3.90	3.91	3.90	3.84	3.85	3.87	3.90	3.88	3.89	3.88	3.89	3.86
77	Lake Erie & Western 1st M 5s 1937.....	3.95	4.00	4.01	4.01	4.09	4.16	4.16	4.19	4.19	4.19	4.19	4.13	4.09
78	Wabash RR Co 1st M 5s 1939.....	4.15	4.14	4.23	4.23	4.18	4.26	4.26	4.29	4.34	4.29	4.29	4.26	4.23
80	Rome Water & Oudens cons M 5s 1922.....	3.56	3.55	3.60	3.69	3.70	3.81	3.80	3.82	3.79	3.71	3.75	3.78	3.78
81	N Y Chic & St Louis 1st M 4s 1937.....	3.83	3.84	3.84	3.87	3.88	3.91	3.96	3.96	3.94	3.90	3.84	3.86	3.87
82	Ches & Ohio Ry 1st cons 5s 1939.....	4.05	4.08	4.18	4.21	4.15	4.20	4.23	4.28	4.29	4.25	4.24	4.23	4.22
83	Ill Central (L N O & T) col 4s 1953.....	3.91	3.91	3.92	3.93	3.89	3.96	3.94	4.00	4.00	3.97	3.91	3.93	3.91
84	C & O (R & A Dv) 1st cons M 4s 1939.....	3.94	3.94	3.97	3.95	3.92	3.91	4.07	4.09	4.09	4.11	4.06	4.01	3.99
85	C C & St L (St L Dv) 1st col 4s 1940.....	3.94	3.92	3.92	3.96	3.95	3.98	3.99	4.07	4.10	4.11	4.02	4.02	4.02
86	E Tenn V & G Ry cons 1st M 5s 1936.....	4.15	4.18	4.20	4.24	4.25	4.31	4.31	4.34	4.36	4.33	4.23	4.23	4.21
87	Chic Milw & St Paul gen M 4s 1937.....	3.59	3.59	3.63	3.67	3.66	3.68	3.74	3.89	3.84	3.73	3.67	3.67	3.68
88	Lake Sh & Mich So 1st M 3½s 1937.....	3.33	3.39	3.43	3.51	3.46	3.46	3.53	3.60	3.61	3.56	3.48	3.50	3.50
89	St P Min & Man (Mon Ex) 1st M 4s 1937.....	3.83	3.91	3.90	3.95	3.96	4.01	3.99	4.02	4.01	3.99	3.99	3.98	3.99
90	Baltimore & Ohio RR 1st M 4s 1948.....	3.95	3.95	3.99	4.00	3.93	3.97	4.03	4.06	4.03	3.98	4.00	4.00	3.99
91	Union Pac RR 1st M RR & lg 4s 1947.....	3.85	3.89	3.92	3.95	3.96	3.97	4.00	4.04	4.07	4.00	3.96	3.95	3.90
92	Chicago & Nor West gen M 3½s 1937.....	3.38	3.44	3.52	3.59	3.49	3.50	3.53	3.70	3.71	3.62	3.55	3.55	3.59
93	Chi Rock Is & Pac Ry gen M 4s 1938.....	3.73	3.77	3.81	3.83	3.82	3.85	3.94	4.01	4.05	3.97	3.94	3.95	3.91
94	Atch Top & Santa Fe gen M 4s 1935.....	3.95	3.97	4.00	4.01	4.02	4.04	4.08	4.10	4.09	4.05	4.01	4.05	4.08
95	N Y Cent & Hudson River M 3½s 1937.....	3.36	3.38	3.41	3.46	3.44	3.44	3.60	3.69	3.68	3.61	3.57	3.59	3.58
96	Scioto Val & New Eng 1st M 4s 1939.....	4.00	4.02	4.04	4.04	4.01	4.14	4.14	4.17	4.16	4.18	4.10	4.10	4.04
97	Lehigh Valley (N Y) 1st M 4½s 1940.....	4.08	4.09	4.10	4.16	4.15	4.16	4.18	4.19	4.32	4.30	4.22	4.22	4.22
98	Louisville & Nash unified 4s 1940.....	3.98	3.98	4.07	4.02	4.02	4.04	4.07	4.11	4.12	4.15	4.17	4.11	4.07
99	Oregon RR & Nav Co cons M 4s 1946.....	3.97	4.03	4.06	4.06	4.05	4.11	4.14	4.16	4.20	4.15	4.10	4.10	4.06
100	Chi Eir & Q (Ill Div) M 3½s 1949.....	3.69	3.73	3.78	3.78	3.75	3.81	3.93	3.99	3.93	3.83	3.79	3.84	3.86
101	Central Pacific 1st rel M 4s 1949.....	4.06	4.07	4.08	4.11	4.08	4.18	4.18	4.15	4.15	4.11	4.09	4.07	4.08
102	Nor Pac Ry prior lien lg M 4s 1937.....	3.89	3.90	3.94	3.94	3.92	3.97	4.00	4.03	4.02	4.01	3.96	3.93	3.92
103	Nor & West Ry 1st cons M 4s 1936.....	4.01	4.00	4.03	4.09	4.03	4.10	4.17	4.20	4.21	4.19	4.16	4.18	4.18
104	Central RR of N J gen M 5s 1937.....	3.70	3.74	3.82	3.84	3.79	3.82	3.88	3.90	3.90	3.87	3.87	3.87	3.82
105	Hocking Valley 1st cons M 4½s 1939.....	4.16	4.18	4.22	4.26	4.25	4.26	4.31	4.33	4.34	4.32	4.31	4.33	4.32

YIELDS OF RAILROAD BONDS
Jan. 1904—Jan. 1905

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
54	St. P. & Santa Fe RR 1st M 6s 1919	4.22	4.31	4.22	4.12	4.08	4.08	4.03	4.01	4.01	3.99	3.98	3.90	3.86
55	Chic. & St. P. RR 1st M 6s 1910	4.00	4.10	4.15	4.13	4.09	4.09	3.98	3.97	3.97	3.97	3.95	3.91	3.91
56	C. M. & St. P. RR 1st M 6s 1921	4.70	3.80	3.85	3.88	3.86	3.83	3.77	3.75	3.72	3.72	3.71	3.70	3.64
60	Pennsylvania Co gen 1st M 4½s 1921	3.84	3.86	3.89	3.92	3.91	3.89	3.85	3.83	3.80	3.82	3.78	3.75	3.62
63	New York Lack & West 1st M 6s 1921	3.84	3.81	3.79	3.79	3.79	3.80	3.70	3.68	3.66	3.66	3.66	3.66	3.63
64	West Shore RR 1st M 4s 2361	3.71	3.70	3.73	3.75	3.74	3.74	3.72	3.72	3.72	3.71	3.71	3.70	3.69
70	St. Paul Minn & Man cons M 4½s 1933	4.04	4.09	4.10	4.09	4.08	4.03	4.01	3.97	3.93	3.93	3.89	3.87	3.81
73	Illinois Central RR coll 4s 1952	3.83	3.89	3.91	3.89	3.87	3.76	3.80	3.82	3.82	3.80	3.83	3.84	3.82
76	Lake Erie & Western 1st M 6s 1937	4.09	4.21	4.24	4.18	4.19	4.17	4.10	4.12	4.12	4.12	4.07	4.09	4.08
78	Wabash RR Co 1st M 8s 1939	4.23	4.23	4.24	4.19	4.19	4.14	4.10	4.12	4.12	4.12	4.07	4.09	4.08
80	Rome Water & Osgood cons M 5s 1922	3.78	3.81	3.87	3.77	3.87	3.83	3.76	3.66	3.68	3.69	3.70	3.71	3.64
81	N Y Chic & St. Louis 1st M 4s 1937	3.87	3.87	3.86	3.84	3.82	3.84	3.81	3.81	3.78	3.76	3.79	3.81	3.82
82	Ches & Ohio Ry 1st cons 5s 1939	4.22	4.22	4.23	4.20	4.18	4.13	4.07	4.08	4.07	4.05	4.00	4.04	4.02
83	Ill Central (L N O & T) coll 4s 1953	3.91	3.92	3.94	3.92	3.89	3.86	3.83	3.87	3.89	3.88	3.87	3.82	3.79
84	C & O (R & A Dr) 1st cons M 4s 1989	3.99	3.97	3.98	3.99	4.01	3.98	3.96	3.94	3.95	3.94	3.97	3.96	3.92
85	C C & St. L (St L Dr) 1st coll 4s 1900	4.01	4.02	4.00	3.97	3.98	3.97	3.97	3.96	3.96	3.97	3.98	3.99	3.97
86	E. Tenn & Ga. Ry 1st M 4s 1956	4.01	4.22	4.23	4.21	4.17	4.17	4.17	4.16	4.16	4.12	4.06	4.06	4.05
87	Chic Milw & St. Paul gen M 4s 1989	3.68	3.69	3.73	3.71	3.70	3.71	3.68	3.66	3.67	3.66	3.65	3.62	3.55
88	Lake Sh. & Mich So 1st M 3½s 1997	3.50	3.51	3.58	3.58	3.55	3.54	3.51	3.50	3.51	3.52	3.50	3.50	3.49
89	St. P. Min & Man (Mon Ex) 1st M 4s 1937	3.99	3.99	4.00	4.00	3.97	3.92	3.86	3.84	3.87	3.87	3.87	3.83	3.82
90	Baltimore & Ohio RR 1st M 4s 1948	3.99	4.02	4.01	3.98	3.98	3.93	3.90	3.91	3.92	3.88	3.86	3.88	3.85
91	Union Pac RR 1st M RR & lg 4s 1947	3.90	3.89	3.89	3.85	3.84	3.82	3.78	3.77	3.80	3.81	3.79	3.77	3.76
92	Chicago & Nor West gen M 3½s 1987	3.59	3.60	3.62	3.59	3.64	3.59	3.57	3.56	3.54	3.56	3.56	3.55	3.52
93	Chi Rock Is & Pac Ry gen M 4s 1988	3.91	3.93	3.93	3.91	3.90	3.89	3.82	3.84	3.84	3.83	3.83	3.83	3.79
94	Arch Top & Santa Fe gen M 4s 1998	4.08	4.08	4.06	4.01	4.01	3.95	3.93	3.92	3.92	3.91	3.91	3.89	3.89
95	N Y Cent & Hudson River M 3½s 1997	3.58	3.61	3.62	3.59	3.58	3.53	3.52	3.51	3.51	3.53	3.52	3.51	3.50
96	Scioto Val & New Eng 1st M 4s 1989	4.04	4.07	4.07	4.05	4.01	4.00	3.98	3.98	3.96	3.96	3.93	3.94	3.94
97	Lehigh Valley (N Y) 1st M 4½s 1940	4.22	4.22	4.23	4.19	4.16	4.11	4.05	4.09	4.09	4.07	4.02	4.00	3.98
98	Louisville & Nash unified 4s 1940	4.07	4.11	4.11	4.08	4.04	4.02	4.00	3.98	4.01	3.97	3.95	3.89	3.85
99	Oregon RR & Nav Co cons M 4s 1946	4.06	4.08	4.05	4.00	3.97	3.93	3.92	3.93	3.93	3.91	3.91	3.89	3.87
100	Chi Bur & Q (Ill Dr) M 3½s 1949	3.86	3.89	3.92	3.91	3.86	3.85	3.81	3.79	3.80	3.80	3.74	3.71	3.69
101	Central Pac 1st red M 4s 1949	4.07	4.10	4.03	4.07	4.04	4.05	4.02	4.01	4.01	3.99	3.98	3.98	3.93
103	Nor Pac Ry 1st gen M 4s 1906	4.18	4.17	4.16	4.11	4.07	4.06	4.01	3.99	3.99	3.99	3.96	3.99	3.98
104	Central RR of N J gen M 5s 1987	3.82	3.83	3.87	3.88	3.84	3.82	3.73	3.72	3.72	3.71	3.70	3.68	3.66
105	Hocking Valley 1st cons M 4½s 1999	4.32	4.29	4.32	4.27	4.25	4.20	4.17	4.16	4.18	4.18	4.14	4.12	4.11

RAILROAD BOND YIELDS

A77

YIELDS OF RAILROAD BONDS
JAN. 1905—JAN. 1906

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
57	Chic St P Minn & Omaha cons M 6s 1930.....	3.91	3.85	3.80	3.83	3.81	3.77	3.74	3.74	3.75	3.74	3.73	3.77	3.80
58	C M & St P C & P W D 1st M 5s 1921.....	3.64	3.62	3.67	3.68	3.72	3.73	3.70	3.70	3.74	3.72	3.79	3.71	3.79
59	Delaware & Potomac RR 1st M 4 1/2s 1921.....	3.62	3.64	3.68	3.71	3.74	3.79	3.79	3.81	3.84	3.81	3.89	3.90	3.91
63	Pennsylvania Co gen 1st M 4 1/2s 1921.....	3.63	3.64	3.66	3.67	3.69	3.66	3.66	3.68	3.66	3.68	3.71	3.72	3.74
64	New York Lack & West 1st M 6s 1921.....	3.69	3.68	3.70	3.70	3.72	3.71	3.69	3.68	3.69	3.69	3.72	3.74	3.71
70	West Shore RR 1st M 4s 2361.....	3.69	3.68	3.70	3.70	3.72	3.71	3.69	3.68	3.69	3.69	3.72	3.74	3.71
73	St Paul Minn & Man cons M 4 1/2s 1933.....	3.81	3.89	3.89	3.90	3.91	3.82	3.80	3.80	3.76	3.74	3.79	3.81	3.77
76	Illinois Central RR coll 4s 1932.....	3.82	3.78	3.76	3.77	3.77	3.77	3.74	3.74	3.72	3.74	3.76	3.74	3.72
77	Lake Erie & Western 1st M 5s 1937.....	3.80	3.82	3.80	3.81	3.82	3.80	3.80	3.80	3.80	3.80	3.80	3.80	3.80
78	Wabash RR Co 1st M 5s 1930.....	4.08	4.08	4.08	4.10	4.09	4.08	4.08	4.08	4.09	4.08	4.08	4.18	4.17
80	Wabash RR Co 1st M 5s 1930.....	4.08	4.08	4.08	4.10	4.09	4.08	4.08	4.08	4.09	4.08	4.08	4.18	4.17
86	Rome Water & Ogden cons M 5s 1922.....	3.64	3.63	3.65	3.65	3.67	3.68	3.68	3.69	3.69	3.71	3.75	3.79	3.80
81	N Y Chic & St Louis 1st M 4s 1937.....	3.82	3.78	3.79	3.77	3.79	3.77	3.77	3.78	3.77	3.77	3.78	3.80	3.78
82	Ches & Ohio Ry 1st cons 5s 1939.....	4.02	4.03	4.07	4.01	4.05	4.07	4.03	4.04	4.06	4.01	4.01	4.02	4.02
83	Ill Central (L N O & T) coll 4s 1933.....	3.79	3.81	3.82	3.83	3.78	3.77	3.78	3.77	3.77	3.77	3.79	3.79	3.79
84	C & O (R & A Div) 1st cons M 4s 1939.....	3.92	3.90	3.91	3.94	3.93	3.93	3.93	3.93	3.94	3.92	3.93	3.93	3.93
85	C C & St L (St L Div) 1st coll 4s 1930.....	3.97	3.92	3.90	3.96	3.96	3.96	3.96	3.96	3.96	3.96	3.96	3.96	3.96
86	E Tenn V & G Ry cons 1st M 5s 1956.....	4.05	4.06	4.07	4.07	4.07	4.09	4.09	4.12	4.11	4.10	4.14	4.16	4.14
87	Cic Milw & St Paul gen M 4s 1989.....	3.55	3.54	3.54	3.56	3.55	3.59	3.59	3.60	3.63	3.63	3.61	3.64	3.62
88	Lake Sh & Mich So 1st M 3 1/2s 1997.....	3.49	3.49	3.50	3.51	3.51	3.49	3.50	3.48	3.45	3.44	3.47	3.49	3.51
89	St P Min & Man (Mon Ex) 1st M 4s 1937.....	3.82	3.81	3.84	3.81	3.83	3.84	3.81	3.81	3.83	3.82	3.83	3.85	3.81
90	Baltimore & Ohio RR 1st M 4s 1948.....	3.85	3.83	3.86	3.86	3.83	3.88	3.79	3.80	3.83	3.85	3.89	3.90	3.85
91	Union Pac RR 1st M RR & Ig 4s 1917.....	3.76	3.74	3.73	3.72	3.78	3.77	3.74	3.73	3.75	3.79	3.81	3.79	3.73
92	Chicago & North Western 1st M 4s 1937.....	3.56	3.56	3.54	3.53	3.53	3.50	3.48	3.49	3.51	3.51	3.54	3.55	3.51
93	Chicago & North Western 1st M 4s 1937.....	3.76	3.77	3.78	3.79	3.79	3.79	3.79	3.79	3.81	3.82	3.84	3.85	3.89
94	Atch-Ton & Santa Fe gen M 4s 1995.....	3.89	3.89	3.89	3.90	3.91	3.89	3.87	3.89	3.86	3.89	3.93	3.93	3.90
95	N Y Cent & Hudson River M 3 1/2s 1997.....	3.50	3.51	3.52	3.52	3.53	3.53	3.54	3.54	3.53	3.53	3.57	3.58	3.56
96	Scioto Val & New Eng 1st M 4s 1989.....	3.94	3.93	3.96	3.96	3.99	3.98	3.93	3.95	3.94	3.97	3.98	4.00	3.99
97	Lehigh Valley (N Y) 1st M 4 1/2s 1940.....	3.98	3.98	3.95	3.96	3.99	3.99	3.95	3.98	3.92	3.97	3.98	3.98	3.98
98	Louisville & Nash unfin 4s 1940.....	3.85	3.85	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86	3.86
99	Oregon RR & New Co cons M 4s 1946.....	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67
100	Chi Bur & Q (Ill Div) M 3 1/2s 1949.....	3.67	3.67	3.68	3.67	3.68	3.68	3.70	3.71	3.71	3.71	3.76	3.76	3.75
101	Central Pacific 1st ref M 4s 1949.....	3.93	3.95	3.99	3.98	3.99	4.00	3.99	3.99	3.97	3.97	3.99	4.00	3.99
102	Nor Pac Ry prior lien 1st M 4s 1997.....	3.82	3.82	3.81	3.81	3.82	3.82	3.82	3.82	3.82	3.82	3.86	3.85	3.81
103	Nor & West Ry 1st cons M 4s 1996.....	3.98	3.91	3.94	3.95	3.94	3.95	3.92	3.95	3.95	3.94	3.95	3.96	3.95
104	Central RR of N J gen M 5s 1987.....	3.66	3.63	3.65	3.67	3.68	3.68	3.68	3.69	3.70	3.72	3.74	3.74	3.76
105	Hocking Valley 1st cons M 4 1/2s 1999.....	4.11	4.06	4.07	4.10	4.09	4.10	4.09	4.03	4.06	4.06	4.09	4.17	4.15
106	N & W Ry Div 1st 1 & gen M 4s 1944.....	4.13	4.06	4.07	4.06	4.06	4.06	4.06	4.04	4.07	4.06	4.09	4.07	4.05
107	Sore Sh Linn RR cons 1st M 5s 1946.....	4.10	4.08	4.06	4.08	4.08	4.14	4.12	4.14	4.12	4.14	4.11	4.11	4.11
108	St Paul & Northern Pac 1st M 4s 1955.....	4.13	4.13	4.16	4.16	4.21	4.23	4.23	4.19	4.18	4.18	4.22	4.23	4.19
109	A T & S Ry radi M 4s stamped 1995.....	4.24	4.17	4.19	4.23	4.24	4.22	4.26	4.23	4.20	4.18	4.25	4.27	4.23
110	Northern Pac Ry gen lien 3s 2047.....	3.95	3.93	3.95	3.96	3.95	3.96	3.96	3.91	3.92	3.90	3.94	3.94	3.92

FIELDS OF RAILROAD BONDS
JAN. 1906—JAN. 1907

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
57	Chic St. P Min & Omaha cons M 6s 1930.....	3.80	3.82	3.90	3.95	4.00	3.97	3.97	4.02	4.06	4.00	4.01	4.04	4.02
60	C M & St P (C & P W Dv) 1st M 5s 1921.....	3.70	3.78	3.87	3.87	3.89	3.97	3.97	4.02	4.00	3.98	4.02	4.03	4.04
63	Pennsylvania Co gu 1st M 4½s 1921.....	3.91	3.93	3.97	3.92	3.99	3.96	4.01	4.05	4.08	4.05	4.01	3.99	3.94
70	West Shore RR 1st M 4s 2361.....	3.71	3.74	3.76	3.78	3.80	3.79	3.80	3.83	3.84	3.83	3.84	3.84	3.85
73	St Paul Minn & Man cons M 4½s 1933.....	3.77	3.82	3.90	3.92	3.97	3.96	4.00	4.05	4.08	3.99	3.93	3.95	4.01
76	Illinois Central RR coll 4s 1952.....	3.72	3.73	3.77	3.77	3.79	3.78	3.78	3.86	3.87	3.86	3.86	3.88	3.91
77	Lake Erie & Western 1st M 5s 1937.....	4.00	3.98	4.05	4.18	4.16	4.10	4.13	4.16	4.23	4.24	4.20	4.19	4.24
78	Wabash RR Co 1st M 5s 1939.....	4.17	4.20	4.22	4.25	4.25	4.24	4.24	4.25	4.28	4.25	4.28	4.30	4.29
81	N Y Chic & St Louis 1st M 4s 1937.....	3.78	3.78	3.78	3.78	3.78	3.80	3.80	3.82	3.86	3.87	3.88	3.91	3.90
82	Ches & Ohio Ry 1st cons 5s 1939.....	4.02	4.02	4.10	4.12	4.10	4.08	4.08	4.15	4.15	4.15	4.10	4.11	4.10
83	Ill Central (L N O & T) col 4s 1953.....	3.79	3.79	3.84	3.83	3.83	3.81	3.81	3.86	3.91	3.90	3.88	3.92	3.92
84	C & O (C & A Dv) 1st cons M 4s 1989.....	3.92	3.95	3.98	3.97	4.00	4.00	4.02	3.97	3.98	4.00	3.97	3.94	4.01
85	C C & St L (St L Dv) 1st col 4s 1980.....	3.93	4.00	4.02	4.03	4.00	4.00	4.04	4.08	4.11	4.11	4.04	4.00	4.06
86	E T & W & C Ry 1st cons 1st M 5s 1956.....	4.14	4.16	4.17	4.18	4.21	4.22	4.20	4.21	4.22	4.22	4.20	4.22	4.24
87	Chic Milw & St Paul gen M 4s 1989.....	3.62	3.67	3.73	3.74	3.79	3.69	3.68	3.71	3.70	3.71	3.74	3.77	3.75
88	Lake Sh & Mich So 1st M 3½s 1997.....	3.51	3.50	3.54	3.54	3.59	3.60	3.62	3.64	3.67	3.71	3.69	3.69	3.74
89	St P Min & Man (Mon Ex) 1st M 4s 1937.....	3.81	3.87	3.93	3.93	3.93	3.89	4.01	3.99	4.04	4.04	4.03	4.01	4.05
90	Baltimore & Ohio RR 1st M 4s 1948.....	3.85	3.85	3.89	3.89	3.92	3.88	3.91	3.92	3.94	3.95	3.99	3.98	3.97
91	Union Pac RR 1st M RR & R 4s 1947.....	3.73	3.79	3.81	3.85	3.87	3.86	3.86	3.82	3.89	3.91	3.91	3.91	3.92
92	Chicago & Nor West gen M 3½s 1987.....	3.51	3.58	3.59	3.59	3.59	3.59	3.59	3.65	3.71	3.69	3.61	3.64	3.61
93	Chi Rock Is & Pac Ry gen M 4s 1988.....	3.89	3.91	3.95	3.95	3.97	3.97	4.00	4.00	4.01	3.99	3.98	3.99	4.00
94	Atch Top & Santa Fe gen M 4s 1997.....	3.90	3.92	3.96	3.96	3.98	3.95	3.94	3.96	3.99	3.96	3.99	3.95	3.98
95	N Y Cent & Hud River M 3½s 1997.....	3.56	3.56	3.60	3.60	3.61	3.61	3.66	3.75	3.83	3.78	3.76	3.79	3.75
96	Scioto Val & New Eng 1st M 4s 1989.....	3.99	4.00	4.01	3.98	4.01	4.01	4.01	4.06	4.09	4.11	4.08	4.08	4.06
97	Leligh Valley (N Y) 1st M 4½s 1940.....	3.99	3.99	4.00	4.02	4.04	4.00	4.01	4.01	4.06	4.07	4.08	4.08	4.09
98	Louisville & Nash unified 4s 1940.....	3.80	3.82	3.85	3.90	3.93	3.91	3.98	3.96	4.06	3.96	3.99	4.00	3.99
99	Oregon RR & Nav Co gen M 4s 1946.....	3.80	3.99	4.00	4.01	4.03	4.01	4.06	4.00	4.01	4.02	4.01	4.06	4.09
100	Chi Bur & Q (Ill Div) M 3½s 1949.....	3.75	3.79	3.84	3.80	3.89	3.88	3.91	3.93	3.94	3.89	3.88	3.89	3.90
101	Central Pacific 1st ref M 4s 1949.....	3.69	4.01	4.04	4.08	4.08	4.02	4.01	4.03	4.08	4.09	4.07	4.06	4.06
102	Nor Pac Ry prior lien M 4s 1997.....	3.81	3.85	3.87	3.88	3.90	3.86	3.87	3.88	3.90	3.90	3.90	3.93	3.95
103	Nor & West Ry 1st cons M 4s 1996.....	3.95	3.99	3.99	3.99	4.00	4.02	4.03	4.03	4.06	4.04	4.03	4.08	4.09
104	Central RR of N J gen M 5s 1987.....	3.75	3.78	3.82	3.89	3.91	3.90	3.92	3.92	3.96	3.92	3.91	3.93	3.96
105	Hocking Valley 1st cons M 4½s 1999.....	4.15	4.16	4.18	4.17	4.25	4.23	4.27	4.27	4.26	4.26	4.27	4.27	4.33
106	N & W Ry Div 1st 1 & gen M 4s 1944.....	4.05	4.07	4.09	4.10	4.17	4.15	4.18	4.22	4.26	4.26	4.26	4.24	4.23
107	Ore Sh Line RR cons 1st M 5s 1946.....	4.11	4.13	4.15	4.22	4.16	4.15	4.18	4.19	4.19	4.19	4.25	4.30	4.32
108	Southern Pac 1st ref M sf 4s 1955.....	4.19	4.17	4.20	4.27	4.27	4.24	4.25	4.24	4.25	4.26	4.26	4.25	4.27
109	A T & S Fe Ry adj M 4s stamped 1995.....	4.23	4.22	4.26	4.34	4.36	4.35	4.37	4.37	4.37	4.36	4.33	4.35	4.37
110	Northern Pac Ry gen lien 4s 2017.....	3.92	3.95	3.96	3.97	3.96	3.98	3.96	3.98	4.00	4.02	4.01	4.07	4.13
111	Atl Coast Line 1st cons M 4s 1952.....	3.97	3.99	4.04	4.05	4.03	4.06	4.07	4.04	4.08	4.12	4.15	4.18	4.16

YIELDS OF RAILROAD BONDS
JAN. 1967—JAN. 1968

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
57	Chic St. P Min & Omaha cons M 4s 1930.	4.02	4.02	4.15	4.18	4.17	4.22	4.14	4.17	4.28	4.73	4.81	4.50	4.37
58	C. N. & St. P C & P W 4 1/2s 1921.	4.01	4.00	4.07	4.10	4.08	4.16	4.12	4.25	4.45	4.33	4.33	4.59	4.31
63	Pennsylvania Co gen M 4 1/2s 1921.	3.94	4.00	4.07	4.11	4.12	4.10	4.16	4.22	4.18	4.24	4.67	4.34	4.16
70	West Shore RR 1st M 4s 2361.	3.85	3.85	3.93	3.91	3.91	3.90	3.94	4.00	4.01	4.05	4.21	4.12	3.99
73	St. Paul Minn & Man cons M 4 1/2s 1933.	4.01	4.00	4.05	4.07	4.13	4.13	4.17	4.22	4.26	4.33	4.50	4.45	4.23
76	Illinois Central RR col 4s 1952.	3.91	3.95	3.99	3.96	4.04	4.13	4.06	4.08	4.10	4.14	4.27	4.17	4.12
77	Lake Erie & Western 1st M 5s 1937.	4.24	4.23	4.26	4.26	4.34	4.38	4.34	4.31	4.34	4.39	4.50	4.58	4.49
78	Wabash RR Co 1st M 5s 1939.	4.29	4.35	4.47	4.47	4.51	4.58	4.60	4.63	4.73	4.80	4.98	4.40	4.61
81	N Y Chic & St. Louis 1st M 4s 1937.	3.90	3.91	3.92	3.97	3.94	3.99	4.01	4.04	4.13	4.17	4.40	4.40	4.23
82	Ches & Ohio Ry 1st cons Ss 1939.	4.19	4.21	4.29	4.30	4.39	4.43	4.45	4.50	4.49	4.67	4.88	4.63	4.49
83	Ill Central (I. N. O. & T) col 4s 1953.	3.92	4.00	4.00	4.02	4.08	4.10	4.09	4.13	4.17	4.17	4.19	4.19	4.12
84	C & O (R & A Div) 1st cons M 4s 1939.	4.01	4.01	4.12	4.16	4.07	4.13	4.14	4.20	4.26	4.33	4.35	4.35	4.27
85	C C & St L (St. L Div) 1st col 4s 1990.	4.06	4.14	4.21	4.21	4.27	4.32	4.29	4.33	4.54	4.77	4.99	4.64	4.64
86	E Tenn V & G Ry cons 1st M 5s 1956.	4.24	4.22	4.26	4.27	4.27	4.33	4.40	4.43	4.56	4.51	4.88	4.82	4.79
87	Chic Milw & St. Paul gen M 4s 1939.	3.75	3.81	3.99	3.92	3.92	3.94	3.94	3.98	4.00	4.01	4.11	4.04	3.96
88	Lake Sh. & Mich So 1st M 3 1/2s 1997.	3.74	3.76	3.79	3.76	3.79	3.83	3.81	3.80	3.74	3.97	4.18	3.95	3.88
89	St. P Min & Man (Mon Ex) 1st M 4s 1937.	4.05	4.12	4.21	4.10	4.13	4.12	4.14	4.25	4.30	4.47	4.41	4.26	4.26
90	Baltimore & Ohio RR 1st M 4s 1948.	3.97	3.99	4.06	4.03	4.05	4.09	4.11	4.19	4.21	4.40	4.48	4.26	4.10
91	Union Pac RR 1st M RR & I 4s 1947.	3.92	3.97	4.02	3.99	4.01	4.03	4.03	4.11	4.16	4.27	4.29	4.09	3.99
92	Chicago & Nor West gen M 3 1/2s 1987.	3.61	3.64	3.71	3.73	3.80	3.73	3.77	3.87	3.91	4.00	3.91	4.00	3.93
93	Chic Rock Is & Pac Ry gen M 4s 1988.	4.00	4.01	4.06	4.06	4.06	4.08	4.08	4.19	4.22	4.29	4.50	4.31	4.11
94	Atch Top & Santa Fe gen M 4s 1995.	3.98	4.00	4.10	4.05	4.11	4.11	4.13	4.20	4.19	4.30	4.37	4.23	4.11
95	N Y Cent & Hudson River M 3 1/2s 1997.	3.75	3.78	3.87	3.82	3.80	3.89	3.90	4.00	4.09	4.11	3.99	3.94	3.94
96	Scioto Val & New Eng 1st M 4s 1969.	4.06	4.08	4.09	4.15	4.19	4.19	4.19	4.39	4.41	4.55	4.47	4.61	4.48
97	Lough Valley (N Y) 1st M 4 1/2s 1940.	4.09	4.11	4.12	4.12	4.19	4.20	4.21	4.19	4.22	4.44	4.44	4.38	4.39
98	Louisville & Nash unified 4s 1940.	3.99	4.01	4.11	4.10	4.04	4.13	4.16	4.20	4.29	4.39	4.50	4.42	4.15
99	Oregon RR & Nav. Co cons M 4s 1946.	4.09	4.11	4.14	4.17	4.18	4.23	4.21	4.30	4.37	4.42	4.75	4.60	4.35
100	Chi Bar & Q (Ill Div) M 3 1/2s 1949.	3.90	3.93	4.00	4.00	4.02	4.13	4.06	4.15	4.13	4.24	4.43	4.29	4.10
101	Central Pacific 1st ref M 19 1/2s 1960.	3.90	3.93	4.00	4.00	4.02	4.31	4.21	4.36	4.34	4.43	4.43	4.40	4.30
102	Nor Pac Ry prior lien M 4s 1997.	3.95	3.98	4.00	3.96	4.00	4.03	4.01	4.12	4.13	4.18	4.22	4.08	4.00
103	Nor & West Ry 1st cons M 4s 1996.	4.09	4.14	4.16	4.09	4.18	4.28	4.29	4.31	4.35	4.40	4.57	4.33	4.28
104	Central RR of N gen M 5s 1987.	3.96	3.96	4.02	4.03	4.03	4.08	4.04	4.11	4.20	4.22	4.37	4.31	4.15
105	Hocking Valley 1st gen M 4s 1999.	4.34	4.34	4.34	4.34	4.37	4.35	4.35	4.35	4.35	4.35	4.35	4.35	4.35
106	N W Ry 1st 1 1/2 gen M 4s 1944.	4.32	4.31	4.41	4.44	4.47	4.46	4.50	4.59	4.64	4.65	4.72	4.73	4.56
107	Ore Sh Line RR cons 1st M 5s 1946.	4.32	4.31	4.41	4.44	4.47	4.46	4.50	4.59	4.64	4.65	4.72	4.73	4.56
108	Southern Pac 1st ref M 4s 1955.	4.27	4.28	4.43	4.39	4.44	4.63	4.44	4.56	4.64	4.77	4.98	4.77	4.52
109	A. & S Fe Ry ad M 4s stamped 1995.	4.37	4.44	4.47	4.48	4.52	4.68	4.48	4.74	4.72	5.03	5.04	4.83	4.45
110	Northern Pac Ry gen lien 3s 2047.	4.18	4.18	4.29	4.28	4.32	4.40	4.21	4.50	4.45	4.74	4.96	4.85	4.68
111	At Coast Line 1st cons M 4s 1932.	4.16	4.18	4.26	4.26	4.26	4.28	4.35	4.53	4.65	4.74	4.96	4.85	4.68

YIELDS OF RAILROAD BONDS
JAN. 1908—JAN. 1909

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
57	Chic St P Min & Omaha cons M 6s 1930.....	4.37	4.32	4.33	4.28	4.21	4.15	4.17	4.14	4.11	4.09	3.99	3.98	3.90
58	C M & St P (C & P W Dv) 1st M 5s 1921.....	4.10	4.13	4.22	4.20	4.17	4.10	4.09	4.00	4.02	4.01	3.99	3.99	4.00
60	Pennsylvania Co gu 1st M 4½s 1921.....	4.16	4.25	4.29	4.18	4.17	4.18	4.09	4.05	4.03	4.02	4.02	4.05	4.08
63	West Shore RR 1st M 4s 2361.....	3.99	3.98	4.02	4.01	4.00	3.93	3.92	3.92	3.92	3.93	3.93	3.91	3.87
70	St Paul Minn & Man cons M 4½s 1933.....	4.23	4.21	4.21	4.18	4.14	4.13	4.09	4.03	4.02	4.01	3.99	3.93	3.87
76	Illinois Central RR coll 4s 1952.....	4.12	4.00	4.08	4.11	4.09	4.09	4.07	3.98	3.99	3.99	3.99	3.99	3.99
77	Lake Erie & West RR 1st M 5s 1937.....	4.40	4.40	4.44	4.49	4.49	4.49	4.51	4.39	4.33	4.31	4.28	4.26	4.23
78	Wabash RR Co 1st M 5s 1939.....	4.61	4.78	4.87	4.73	4.73	4.78	4.71	4.53	4.52	4.42	4.34	4.24	4.24
81	N Y Chic & St Louis 1st M 4s 1937.....	4.23	4.13	4.09	4.08	4.00	4.00	4.01	3.95	3.98	3.96	3.96	3.94	3.94
82	Ches & Ohio Ry 1st cons 5s 1939.....	4.49	4.48	4.56	4.41	4.33	4.32	4.30	4.24	4.21	4.16	4.15	4.09	4.09
83	Ill Central (I N O & T) col 4s 1953.....	4.12	4.04	4.02	4.04	4.02	4.02	3.99	4.00	4.02	4.02	4.03	4.05	4.00
84	C O (R & A Dv) 1st cons M 4s 1960.....	4.27	4.25	4.30	4.29	4.23	4.23	4.17	4.11	4.08	4.06	4.04	4.18	4.10
85	C O (R & A Dv) 2nd cons M 4s 1960.....	4.79	4.78	4.87	4.86	4.68	4.76	4.70	4.60	4.60	4.62	4.46	4.39	4.17
86	E T & W C St Paul 1st M 5s 1956.....	4.79	4.82	4.97	4.86	4.68	4.76	4.70	4.60	4.60	4.62	4.46	4.39	4.17
87	Chic Milw & St Paul gen M 4s 1989.....	3.96	3.92	3.92	3.93	3.96	3.98	3.96	3.95	3.93	3.92	3.89	3.91	3.88
88	Lake Sh & Mich So 1st M 3½s 1997.....	3.88	3.84	3.86	3.82	3.84	3.84	3.80	3.80	3.78	3.77	3.73	3.70	3.69
89	St P Min & Man (Mon Ex) 1st M 4s 1937.....	4.26	4.14	4.17	4.15	4.15	4.18	4.18	4.18	4.15	4.13	4.05	3.95	3.99
90	Baltimore & Ohio RR 1st M 4s 1948.....	4.10	4.09	4.13	4.12	4.11	4.11	4.10	4.08	4.04	4.05	4.02	4.01	3.97
91	Union Pac RR 1st M RR & Ig 4s 1947.....	3.99	4.01	4.06	4.05	4.02	3.99	3.94	3.91	3.91	3.93	3.91	3.87	3.87
92	Chicago & Nor West gen M 3½s 1987.....	3.93	3.89	3.91	3.85	3.82	3.83	3.85	3.84	3.80	3.78	3.68	3.71	3.74
93	Chl Rock Is & Pac Ry gen M 4s 1988.....	4.11	4.16	4.26	4.20	4.14	4.17	4.20	4.23	4.19	4.10	4.06	4.01	3.97
94	Atch Top & Santa Fe gen M 4s 1995.....	4.11	4.10	4.16	4.13	4.10	4.12	4.11	4.08	4.03	4.01	4.00	3.99	3.97
95	N Y Cent & Hudson River M 3½s 1997.....	3.94	3.97	3.98	3.96	3.96	3.89	3.81	3.86	3.84	3.83	3.80	3.76	3.75
96	Scioto Val & New Eng 1st M 4s 1989.....	4.43	4.35	4.50	4.52	4.35	4.29	4.30	4.18	4.14	4.15	4.16	4.14	4.11
97	Lehigh Valley (N Y) 1st M 4½s 1940.....	4.39	4.38	4.34	4.29	4.31	4.30	4.28	4.21	4.15	4.10	4.08	4.08	4.08
98	Louisville & Nash unified 4s 1940.....	4.15	4.14	4.31	4.27	4.24	4.18	4.16	4.12	4.09	4.10	4.03	3.98	3.96
99	Oregon RR & Nav Co cons M 4s 1946.....	4.35	4.30	4.38	4.32	4.26	4.23	4.21	4.06	4.19	4.14	4.05	4.06	4.05
100	Chl Bur & Q (Ill Div) M 3½s 1949.....	4.06	4.04	4.11	4.10	4.03	4.11	4.10	4.06	3.99	3.95	3.91	3.90	3.91
101	Chl Bur & Q (Ill Div) M 3½s 1949.....	4.06	4.04	4.11	4.10	4.03	4.11	4.10	4.06	3.99	3.95	3.91	3.90	3.91
102	Nor Pac Ry prior ten lg M 4s 1997.....	4.06	4.02	4.05	4.03	3.99	3.99	3.95	3.93	3.92	3.94	3.90	3.91	3.90
103	Nor & West Ry 1st cons M 4s 1996.....	4.28	4.26	4.39	4.28	4.27	4.28	4.22	4.13	4.11	4.11	4.06	4.09	4.05
104	Central RR of N gen M 5s 1987.....	4.15	4.09	4.06	4.08	4.05	4.07	4.07	4.04	3.99	3.96	3.88	3.88	3.88
105	Hocking Valley 1st cons M 4½s 1999.....	4.47	4.48	4.49	4.50	4.44	4.47	4.37	4.32	4.31	4.27	4.28	4.23	4.23
106	N & W Ry Div 1st lg gen M 4s 1944.....	4.78	4.74	4.76	4.75	4.70	4.66	4.59	4.56	4.44	4.42	4.36	4.35	4.32
107	Ore Sh Line RR cons 1st M 5s 1946.....	4.56	4.44	4.46	4.37	4.38	4.34	4.43	4.30	4.34	4.26	4.22	4.18	4.14
108	Southern Pac 1st ref M 4s 1955.....	4.52	4.58	4.64	4.61	4.51	4.49	4.44	4.35	4.28	4.28	4.29	4.26	4.23
109	A T & S F R adj M 4s stand 1995.....	4.73	4.68	4.75	4.72	4.66	4.63	4.63	4.58	4.47	4.42	4.39	4.34	4.30
110	Northern Pac R gen M 4s 1947.....	4.73	4.68	4.75	4.72	4.66	4.63	4.63	4.58	4.47	4.42	4.39	4.34	4.30
111	Atl Coast Line 1st cons M 4s 1952.....	4.68	4.94	4.77	4.79	4.51	4.49	4.46	4.21	4.34	4.29	4.27	4.25	4.23

RAILROAD BOND YIELDS

A81

YIELDS OF RAILROAD BONDS
JAN. 1900—JAN. 1910

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
57	Chic St P Min & Omaha cons M 6s 1930.	3.90	3.87	3.90	3.89	3.92	3.94	3.90	3.92	4.01	4.00	4.06	4.07	4.04
58	Wash RR & Pac Ry gen M 4s 1931.	3.87	3.86	3.87	3.86	3.89	3.91	3.88	3.90	3.93	3.90	3.88	3.87	3.94
73	St Paul Minn & Man M 4½s 1913.	3.87	3.89	3.90	3.89	3.90	3.91	3.88	3.90	3.90	3.90	3.90	3.90	3.97
76	Illinois Central RR col 4s 1952.	3.99	3.98	3.99	3.97	4.25	4.25	3.88	3.88	3.90	4.25	4.28	4.28	4.26
78	Wabash RR Co 1st M 5s 1939.	4.24	4.20	4.26	4.27	4.25	4.25	4.23	4.23	4.23	4.25	4.28	4.28	4.26
81	N Y Chic & St Louis 1st M 4s 1937.	3.94	3.93	3.87	3.91	3.91	3.93	3.94	3.95	3.96	3.99	3.98	3.98	3.99
82	Cres & Ohio Ry 1st cons 5s 1939.	4.09	4.08	4.10	4.11	4.11	4.11	4.14	4.14	4.13	4.17	4.24	4.18	4.17
83	Ill Central (J. N. O. & T) col 4s 1953.	4.00	3.97	3.95	3.97	3.98	3.98	3.96	3.96	4.00	3.98	3.97	4.00	4.01
84	C & O (R & A Div) 1st cons M 4s 1989.	4.00	3.98	4.00	4.00	4.00	4.01	4.03	4.02	4.01	4.02	4.06	4.04	4.06
85	C C & St L (St L Div) 1st col 4s 1990.	4.15	4.18	4.17	4.14	4.16	4.15	4.16	4.17	4.22	4.22	4.20	4.22	4.26
86	E Tenn V & G Ry cons 1st M 5s 1956	4.37	4.40	4.35	4.47	4.33	4.37	4.29	4.28	4.30	4.29	4.31	4.37	4.31
87	Chic Milw. & St Paul gen M 4s 1982	3.88	3.87	3.86	3.86	3.83	3.83	3.83	3.84	3.89	3.90	3.87	3.93	3.99
88	Lake Sh & Mich So 1st M 3½s 1997.	3.69	3.68	3.69	3.72	3.73	3.75	3.81	3.83	3.83	3.82	3.83	3.82	3.83
90	Baltimore & Ohio RR 1st M 4s 1948.	3.97	3.94	3.96	3.95	3.94	3.98	3.97	3.97	3.98	4.01	4.04	4.04	4.03
91	Union Pac RR 1st M RR & lg 4s 1947.	3.87	3.83	3.85	3.85	3.85	3.83	3.79	3.82	3.86	3.86	3.88	3.90	3.93
92	Chicago & Nor West gen M 3½s 1987.	3.74	3.76	3.78	3.78	3.79	3.85	3.82	3.86	3.90	3.89	3.91	3.93	3.94
93	Chi Rock Is & Pac Ry gen M 4s 1938.	3.97	3.96	3.98	3.97	3.95	3.97	3.94	4.02	4.05	4.03	4.02	4.04	4.06
94	Chi Rock Is & Pac Ry gen M 4s 1994.	3.92	3.95	3.96	3.96	3.96	3.96	3.94	3.97	3.99	3.99	4.01	4.01	3.98
95	N Y Cent & Hudson 1st M 3½s 1997.	3.92	3.95	3.96	3.96	3.96	3.97	3.94	3.97	3.99	3.99	4.01	4.01	3.98
96	Scioto Val & New Eng 1st M 4s 1989.	4.11	4.08	4.14	4.08	4.13	4.14	4.13	4.13	4.15	4.15	4.22	4.21	4.22
97	Lehigh Valley (N Y) 1st M 4½s 1940.	4.08	4.06	4.06	4.06	4.03	4.04	4.05	4.05	4.05	4.07	4.10	4.13	4.03
98	Louisville & Nash. unified 4s 1940.	3.96	3.90	3.92	3.92	3.95	3.98	3.97	3.99	4.03	4.06	4.02	4.01	4.01
99	Oregon RR & Nav ('o cons M 4s 1946.	4.05	4.03	4.06	4.07	4.05	4.07	4.08	4.06	4.06	4.06	4.08	4.13	4.13
100	Chi Bur & Q (Ill Div) M 3½s 1949.	3.91	3.88	3.91	3.92	3.92	3.96	3.94	3.98	3.99	4.02	4.03	4.03	4.05
101	Central Pacific 1st ref M 4s 1949.	4.16	4.09	4.12	4.12	4.13	4.15	4.13	4.14	4.15	4.15	4.16	4.17	4.14
102	Nor Pac Ry prior lien 1st M 4s 1996.	3.90	3.87	3.89	3.90	3.91	3.91	3.91	3.90	3.92	3.93	3.93	3.91	3.94
103	Nor & West Ry 1st cons M 4s 1996.	4.05	4.04	4.05	4.05	4.06	4.06	4.01	4.01	4.04	4.03	4.03	4.07	4.04
104	Central RR of N J gen M 5s 1987.	3.88	3.86	3.86	3.84	3.84	3.88	3.87	3.88	3.89	3.92	3.96	3.96	3.96
105	Hocking Valley 1st cons M 4½s 1999.	4.23	4.16	4.15	4.28	4.25	4.26	4.26	4.25	4.28	4.31	4.36	4.36	4.39
106	N & W Ry Div 1st 1 & gen M 4s 1944.	4.32	4.33	4.37	4.35	4.35	4.36	4.37	4.37	4.37	4.44	4.40	4.41	4.41
107	Ore Sh Line RR cons 1st M 5s 1946.	4.14	4.08	4.12	4.13	4.15	4.15	4.21	4.25	4.25	4.26	4.29	4.28	4.28
108	Southern Pac 1st ref M 4s 1955.	4.23	4.24	4.23	4.24	4.25	4.26	4.23	4.25	4.26	4.29	4.27	4.27	4.26
109	A T & S F Ry 4th M 4s stamped 1995.	4.30	4.22	4.24	4.27	4.28	4.26	4.27	4.27	4.25	4.25	4.24	4.24	4.24
110	Western Pac Ry gen M 4s 2047.	4.68	4.04	4.04	4.04	4.04	4.05	4.06	4.06	4.05	4.10	4.17	4.11	4.11
111	Alt Coast Line 1st cons M 4s 1952.	4.23	4.15	4.15	4.15	4.15	4.19	4.19	4.19	4.25	4.24	4.24	4.26	4.26
112	Del & Hudson Co 1st & ref M 4s 1943.	3.92	3.89	3.88	3.87	3.86	3.87	3.88	3.90	3.93	3.96	3.97	3.98	4.00
113	Central of Georgia cons M 5s 1945.	4.50	4.41	4.43	4.44	4.42	4.41	4.40	4.42	4.45	4.48	4.52	4.51	4.51
114	Pennsylvania RR cons M 4s 1948.	3.78	3.78	3.78	3.76	3.75	3.76	3.78	3.78	3.81	3.80	3.78	3.79	3.78
115	Kansas City So Ry 1st M 3s 1950.	4.37	4.31	4.30	4.31	4.33	4.32	4.32	4.32	4.34	4.34	4.42	4.42	4.44
116	L & N (Atl Knox & Cin Div) 4s 1955.	4.24	4.19	4.18	4.18	4.18	4.20	4.24	4.22	4.27	4.30	4.31	4.31	4.29
117	Illinois Central RR ref M 4s 1955.	3.99	3.95	3.97	3.97	3.98	4.00	4.00	4.03	4.04	4.03	4.04	4.04	4.04
118	Chic Huron & Quincy gen M 4s 1958.	3.94	3.97	3.99	3.97	3.99	4.04	3.99	4.04	4.02	4.04	4.03	4.03	4.03
119	St Louis & San Fran 1st cons M 4s 1960.	4.57	4.44	4.47	4.46	4.43	4.45	4.47	4.45	4.49	4.57	4.61	4.50	4.50
120	Un Pac RR 1st lien & ref M 4s 2008.	4.61	4.53	4.63	4.63	4.61	4.61	4.62	4.64	4.66	4.70	4.71	4.79	4.70

YIELDS OF RAILROAD BONDS
JAN. 1910—JAN. 1911

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	Chic St. P Min & Omaha cons M 6s 1930.....	4.04	4.07	4.10	4.14	4.22	4.22	4.22	4.17	4.09	4.11	4.13	4.14	4.14
77	West Shore RR 1st M 4s 2361.....	3.94	3.94	3.97	3.97	3.99	3.95	3.95	3.95	3.95	3.95	3.96	3.96	3.95
73	St. Paul Minn & Man cons M 4 3/8s 1933.....	4.01	4.02	4.11	4.13	4.19	4.11	4.18	4.16	4.16	4.04	4.08	4.12	4.11
76	Illinois Central RR coll 4s 1952.....	3.97	4.00	4.00	4.00	4.02	4.05	4.04	4.05	4.02	4.04	4.03	4.07	4.10
78	Wabash RR Co 1st M 5s 1939.....	4.26	4.31	4.35	4.46	4.49	4.44	4.50	4.54	4.43	4.43	4.45	4.44	4.43
81	N Y Chic & St Louis 1st M 4s 1937.....	3.99	3.98	4.02	4.02	4.03	4.09	4.11	4.09	4.07	4.01	4.01	4.03	4.01
82	Chic & Onto Ry cons M 5s 1939.....	4.17	4.15	4.17	4.22	4.26	4.30	4.31	4.30	4.26	4.27	4.23	4.23	4.23
83	Ill Central (L N O & T) col 4s 1953.....	4.01	4.00	4.01	4.07	4.01	4.07	4.14	4.12	4.08	4.03	4.03	4.04	4.09
84	C & C O R & A (St L) 1st cons M 4s 1989.....	4.09	4.05	4.07	4.10	4.10	4.12	4.19	4.23	4.16	4.10	4.15	4.16	4.17
85	C C & St L (St L Dr) 1st col 4s 1990.....	4.26	4.24	4.19	4.28	4.33	4.39	4.44	4.46	4.28	4.27	4.32	4.27	4.27
86	E Tenn V & G Ry cons 1st M 5s 1956.....	4.31	4.36	4.37	4.42	4.39	4.51	4.47	4.47	4.45	4.44	4.45	4.49	4.45
87	Chic Milw & St Paul gen M 5s 1989.....	3.93	3.94	3.92	3.98	3.93	3.93	3.97	4.06	4.02	4.04	4.04	4.03	4.03
88	Chic Milw & St Paul 1st M 5s 1989.....	4.03	4.03	4.06	4.08	4.11	4.07	4.07	4.06	4.02	4.05	4.05	4.08	4.02
89	Blaine Sh & Mill RR 1st M 1948.....	3.93	3.94	3.96	3.99	3.96	3.96	3.97	3.97	3.93	3.92	3.93	3.95	3.96
91	Union Pac RR 1st M RR & lg 4s 1947.....	3.93	3.94	3.96	3.99	3.96	3.96	3.97	3.97	3.93	3.92	3.93	3.95	3.96
92	Chicago & Nor West gen M 3 1/8s 1987.....	3.94	3.96	3.99	4.04	4.02	4.01	4.03	3.98	3.95	3.94	3.99	4.01	4.00
93	Chi Rock Is & Pac Ry gen M 4s 1988.....	4.06	4.07	4.11	4.15	4.17	4.19	4.18	4.20	4.14	4.11	4.11	4.11	4.11
94	Arch Top & Santa Fe gen M 4s 1995.....	3.98	3.99	4.02	4.05	4.05	4.05	4.06	4.08	4.04	4.04	4.07	4.04	4.04
95	N Y Cent & Hudson River M 3 1/8s 1997.....	3.84	3.88	3.91	3.93	3.95	3.98	4.01	3.99	3.97	3.93	3.97	3.94	3.93
97	Lehigh Valley (N Y) 1st M 4 3/8s 1940.....	4.03	4.06	4.07	4.12	4.13	4.16	4.17	4.16	4.12	4.10	4.12	4.08	4.09
98	Louisville & Nash unified 4s 1940.....	4.01	4.06	4.09	4.10	4.10	4.15	4.17	4.15	4.12	4.12	4.10	4.10	4.08
99	Oregon RR & Nav Co cons M 4s 1946.....	4.13	4.15	4.19	4.25	4.28	4.26	4.25	4.25	4.20	4.18	4.30	4.25	4.18
100	Chi Bur & Q (Ill Div) M 3 1/8s 1949.....	4.05	4.08	4.13	4.16	4.18	4.17	4.19	4.12	4.10	4.09	4.12	4.11	4.12
101	Central Pacific 1st ref M 4s 1949.....	4.14	4.14	4.16	4.18	4.19	4.21	4.22	4.20	4.17	4.17	4.17	4.16	4.16
102	Nor Pac Ry prior lien lg M 4s 1997.....	3.94	3.98	3.98	4.01	3.99	3.99	4.03	4.04	3.98	4.00	4.03	4.02	4.02
103	Nor & West Ry 1st cons M 4s 1996.....	4.04	4.03	4.04	4.06	4.05	4.07	4.08	4.12	4.05	4.01	4.06	4.04	4.04
104	Central RR of N J gen M 5s 1987 1999.....	3.96	3.98	3.98	4.03	4.03	4.05	4.10	4.09	4.03	4.02	4.04	4.05	4.04
105	Nor & West Ry 1st cons M 4s 1996.....	4.39	4.39	4.33	4.43	4.46	4.38	4.49	4.48	4.43	4.37	4.41	4.39	4.40
106	N Y & W R R Div 1st M 5s 1944.....	4.41	4.42	4.43	4.44	4.46	4.48	4.49	4.48	4.43	4.37	4.41	4.39	4.40
107	Ore Sh Line RR cons 1st M 5s 1946.....	4.28	4.27	4.27	4.31	4.40	4.44	4.49	4.49	4.39	4.31	4.36	4.35	4.31
108	Southern Pac 1st ref M 4s 1955.....	4.26	4.24	4.23	4.27	4.29	4.31	4.32	4.30	4.29	4.25	4.29	4.30	4.26
109	A T & S Fe Ry adf M 4s stamped 1995.....	4.24	4.24	4.27	4.41	4.45	4.46	4.47	4.45	4.39	4.36	4.42	4.40	4.35
110	Northern Pac Ry gen hen 5s 2047.....	4.11	4.10	4.12	4.27	4.22	4.27	4.30	4.26	4.22	4.23	4.26	4.28	4.27
111	Atl Coast Line 1st cons M 4s 1952.....	4.26	4.19	4.22	4.29	4.31	4.35	4.35	4.37	4.27	4.20	4.26	4.30	4.27
112	Del & Hudson Co 1st & ref M 4s 1943.....	4.00	4.00	4.04	4.08	4.10	4.10	4.11	4.11	4.06	4.06	4.07	4.03	4.01
113	Central of Georgia cons M 5s 1945.....	4.51	4.51	4.53	4.55	4.74	4.72	4.72	4.69	4.57	4.59	4.61	4.59	4.56
114	Pennsylvania RR cons M 4s 1948.....	3.78	3.77	3.79	3.82	3.84	3.86	3.87	3.91	3.88	3.87	3.88	3.82	3.82
115	Kansas City So Ry 1st M 3s 1950.....	4.44	4.42	4.45	4.50	4.48	4.47	4.51	4.51	4.45	4.44	4.43	4.43	4.43
116	L & N (Atl Knox & Cin Div) 4s 1955.....	4.29	4.25	4.25	4.34	4.30	4.36	4.47	4.37	4.33	4.33	4.39	4.41	4.41
117	Illinois Central RR ref M 4s 1955.....	4.04	4.04	4.05	4.10	4.11	4.11	4.15	4.17	4.12	4.06	4.10	4.13	4.12
118	Chic Burl & Quincy gen M 4s 1958.....	4.03	4.04	4.06	4.09	4.11	4.10	4.11	4.09	4.11	4.12	4.14	4.14	4.11
119	Southern Ry 1st cons M 5s 1994.....	4.55	4.41	4.62	4.72	4.75	4.77	4.80	4.77	4.69	4.60	4.61	4.64	4.63
120	Un Pac RR 1st lien & ref M 4s 2008.....	4.10	4.11	4.11	4.12	4.15	4.17	4.19	4.18	4.16	4.12	4.14	4.15	4.13
121	Atl Coast Line (L & N coll) 4s 1952.....	4.34	4.34	4.32	4.44	4.47	4.51	4.54	4.49	4.39	4.37	4.40	4.40	4.35

RAILROAD BOND YIELDS

A83

Ref.	No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
57	Chic St. P. Min. & Omaha cons M 6s 1930.....	4.14	4.13	4.13	4.15	4.12	4.10	4.09	4.09	4.07	4.12	4.21	4.17	4.18	4.15
70	West Shore RR cons M 4s 1930.....	3.95	3.97	3.97	3.98	3.96	3.96	3.99	3.99	3.99	4.02	3.99	3.98	3.98	3.98
73	St. Paul Minn. & Man. cons M 4½s 1933.....	4.11	4.12	4.13	4.13	4.08	4.09	4.10	4.11	4.11	4.15	4.12	4.08	4.08	4.11
76	Illinois Central RR col 4s 1952.....	4.10	4.10	4.11	4.08	4.08	4.08	4.06	4.06	4.04	4.05	4.04	4.03	4.03	4.03
78	Wabash RR Co 1st M 5s 1939.....	4.43	4.41	4.43	4.48	4.46	4.48	4.48	4.48	4.48	4.51	4.57	4.64	4.69	4.62
81	N Y Chic & St. Louis 1st M 4s 1937.....	4.01	4.02	4.01	4.02	4.04	4.02	4.03	4.03	4.06	4.03	4.02	4.01	4.00	4.00
82	Ches & Ohio Ry 1st cons Ss 1939.....	4.20	4.21	4.24	4.27	4.24	4.23	4.24	4.27	4.27	4.27	4.30	4.28	4.30	4.30
84	Ches & Ohio Ry 2nd col 4s 1933.....	4.09	4.10	4.11	4.10	4.09	4.09	4.08	4.08	4.08	4.08	4.07	4.07	4.04	4.04
85	C C & St L (St L Div) 1st col 4s 1900.....	4.27	4.27	4.30	4.35	4.30	4.30	4.30	4.30	4.36	4.36	4.35	4.35	4.36	4.32
86	E Tenn V & G Ry cons 1st M 5s 1956.....	4.45	4.44	4.45	4.45	4.42	4.44	4.43	4.43	4.42	4.47	4.49	4.43	4.44	4.42
87	Chic Milw & St. Paul gen M 4s 1989.....	4.03	4.04	4.05	4.05	4.06	4.06	4.06	4.07	4.07	4.07	4.07	4.04	4.05	4.05
88	Lake Sh & Mich So 1st M 3½s 1997.....	3.92	3.93	3.94	3.94	3.93	3.95	3.96	3.97	3.95	3.97	3.96	3.91	3.97	3.93
90	Baltimore & Ohio RR 1st M 4s 1948.....	4.08	4.07	4.08	4.07	4.08	4.09	4.09	4.09	4.09	4.10	4.07	4.06	4.09	4.10
91	Union Pac RR 1st M RR & lg 4s 1947.....	3.96	3.97	3.97	3.93	3.94	3.93	3.93	3.94	3.94	3.97	3.95	3.94	3.95	3.96
92	Chicago & Nor West gen M 3½s 1987.....	4.00	4.02	4.04	4.04	4.04	4.05	4.06	4.06	4.10	4.11	4.11	4.06	4.04	4.05
93	Chi Rock Is & Pac RR gen M 4s 1988.....	4.11	4.15	4.16	4.13	4.11	4.12	4.14	4.16	4.16	4.17	4.17	4.15	4.17	4.16
94	Arch Top & Santa Fe gen M 4s 1995.....	4.04	4.04	4.06	4.04	4.04	4.05	4.05	4.04	4.05	4.04	4.05	4.04	4.03	4.03
95	N Y Cent & Hudson River M 3½s 1997.....	3.93	3.98	3.99	3.97	3.97	4.00	4.00	4.01	4.00	4.02	4.00	3.98	3.99	4.02
97	Lehigh Valley (N Y) 1st M 4½s 1940.....	4.09	4.12	4.15	4.16	4.16	4.14	4.14	4.18	4.19	4.17	4.17	4.17	4.19	4.18
98	Louisville & Nash unified 4s 1940.....	4.08	4.08	4.09	4.08	4.08	4.08	4.08	4.04	4.07	4.09	4.07	4.05	4.05	4.05
99	Crean Pac & N W Co cons M 4s 1946.....	4.18	4.22	4.25	4.19	4.18	4.22	4.23	4.23	4.21	4.36	4.29	4.23	4.23	4.24
100	Central Pac Ry 1st M 4s 1949.....	4.16	4.18	4.20	4.20	4.14	4.15	4.16	4.16	4.16	4.18	4.17	4.15	4.18	4.17
101	Central Pac Ry 1st M 4s 1949.....	4.16	4.18	4.20	4.20	4.14	4.15	4.16	4.16	4.16	4.18	4.17	4.15	4.18	4.17
102	Nor Pac Ry prior lien lg M 4s 1997.....	4.02	4.00	4.03	4.02	4.01	4.04	4.04	4.04	4.06	4.05	4.02	4.02	4.04	4.01
103	Nor & West Ry 1st cons M 4s 1996.....	4.04	4.04	4.06	4.05	4.07	4.08	4.09	4.09	4.09	4.08	4.05	4.04	4.08	4.06
104	Central RR of N J gen M 5s 1987.....	4.04	4.03	4.04	4.03	4.03	4.05	4.06	4.06	4.09	4.09	4.08	4.05	4.07	4.05
105	Hocking Valley 1st cons M 4½s 1999.....	4.39	4.39	4.40	4.37	4.35	4.37	4.38	4.42	4.43	4.42	4.39	4.38	4.38	4.40
107	N & W Ry Div 1st & gen M 4s 1944.....	4.40	4.40	4.42	4.39	4.42	4.39	4.41	4.43	4.44	4.47	4.39	4.38	4.35	4.36
108	Ore Line RR cons 1st M 3s 1946.....	4.31	4.30	4.30	4.30	4.30	4.32	4.32	4.32	4.39	4.45	4.33	4.36	4.37	4.35
108	Southern Pac 1st ref M 4s 1955.....	4.26	4.25	4.26	4.23	4.21	4.24	4.24	4.25	4.27	4.30	4.28	4.26	4.26	4.25
109	A T & S Fe Ry adj. M 4s stamped 1995.....	4.35	4.36	4.39	4.37	4.37	4.37	4.37	4.36	4.36	4.38	4.37	4.36	4.37	4.35
110	Northern Pac Ry gen lien 3s 2047.....	4.27	4.27	4.25	4.26	4.25	4.25	4.25	4.24	4.27	4.37	4.36	4.33	4.35	4.35
111	Atl Coast Line 1st cons M 4s 1952.....	4.30	4.30	4.32	4.26	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23	4.23
112	Del & Hudson Co 1st & ref M 4s 1943.....	4.01	4.07	4.09	4.08	4.06	4.07	4.08	4.08	4.10	4.10	4.08	4.07	4.07	4.07
113	Central of Georgia cons M 5s 1945.....	4.56	4.52	4.52	4.51	4.51	4.51	4.51	4.47	4.47	4.50	4.52	4.48	4.45	4.45
114	Piedmont RR cons M 4s 1948.....	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.82	3.86	3.86	3.82	3.86	3.82	3.82
115	Kansas City S W Ry cons M 4s 1955.....	4.41	4.41	4.42	4.42	4.42	4.42	4.42	4.39	4.38	4.42	4.43	4.41	4.44	4.44
116	L & N (Atl Knox & Cin Div) 4s 1955.....	4.41	4.35	4.36	4.35	4.33	4.33	4.33	4.37	4.38	4.39	4.40	4.37	4.39	4.43
117	Illinois Central RR ref M 4s 1955.....	4.12	4.14	4.17	4.16	4.15	4.16	4.16	4.17	4.18	4.18	4.17	4.17	4.18	4.19
118	Chic Burl & Quincy gen M 4s 1958.....	4.11	4.12	4.14	4.14	4.13	4.17	4.16	4.16	4.18	4.20	4.17	4.16	4.17	4.15
119	Union Pac RR 1st cons M 5s 1994.....	4.63	4.63	4.66	4.66	4.66	4.61	4.61	4.66	4.72	4.67	4.62	4.62	4.63	4.63
120	Un Pac RR 1st lien & ref M 4s 2002.....	4.13	4.14	4.15	4.13	4.13	4.09	4.10	4.13	4.14	4.15	4.14	4.11	4.11	4.11
121	Atl Coast Line (L & N coll) 4s 1958.....	4.33	4.27	4.31	4.30	4.29	4.30	4.30	4.30	4.37	4.41	4.37	4.28	4.27	4.23

YIELDS OF RAILROAD BONDS
JAN. 1912—JAN. 1913

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361	3.98	3.97	3.99	3.98	3.99	4.00	4.00	4.01	4.05	4.06	4.07	4.10	4.06
71	St. Paul & N. W. RR 4 1/2s 1933	4.11	4.11	4.12	4.14	4.15	4.17	4.18	4.23	4.24	4.22	4.21	4.22	4.21
76	Illinois Central RR coll 4s 1952	4.03	4.00	4.05	4.04	4.02	4.12	4.09	4.07	4.04	4.05	4.09	4.19	4.24
78	Wabash RR Co 1st M 4s 1939	4.62	4.53	4.54	4.52	4.54	4.59	4.55	4.56	4.61	4.60	4.59	4.61	4.61
81	N Y Chic & St. Louis 1st M 4s 1937	4.00	3.98	3.98	4.00	4.01	4.00	4.02	4.06	4.13	4.14	4.09	4.05	4.06
82	Cres & Ohio Ry 1st cons 5s 1939	4.30	4.27	4.33	4.31	4.31	4.37	4.36	4.37	4.40	4.42	4.38	4.39	4.39
83	Ill. Central (L N O & T) col 4s 1953	4.34	4.34	4.37	4.41	4.42	4.43	4.44	4.43	4.48	4.44	4.43	4.43	4.43
85	St. C & O Ry 1st Div 4s 1950	4.34	4.34	4.37	4.41	4.42	4.43	4.44	4.43	4.48	4.44	4.43	4.43	4.43
86	St. C & O Ry 1st Div 4s 1950	4.42	4.43	4.42	4.41	4.41	4.44	4.48	4.47	4.48	4.48	4.50	4.51	4.50
87	St. V & G R 1st M 4s 1956	4.05	4.06	4.06	4.07	4.07	4.07	4.11	4.13	4.12	4.10	4.10	4.08	4.07
87	Chic Milw & St. Paul gen M 4s 1989	4.05	4.06	4.06	4.07	4.07	4.07	4.11	4.13	4.12	4.10	4.10	4.08	4.07
88	Lake Sh & Mich So 1st M 3 1/2s 1997	3.93	3.96	3.98	3.99	3.97	3.99	3.96	4.00	4.00	3.97	4.00	4.02	4.00
90	Baltimore & Ohio RR 1st M 4s 1948	4.10	4.06	4.07	4.09	4.09	4.10	4.13	4.20	4.16	4.15	4.13	4.14	4.14
91	Union Pac RR 1st M RR & lg 4s 1947	3.96	3.97	3.96	3.99	3.93	3.98	3.98	4.02	4.04	4.01	4.10	4.05	4.05
92	Chicago & Nor West gen M 3 1/2s 1988	4.17	4.17	4.17	4.17	4.17	4.17	4.17	4.23	4.21	4.23	4.25	4.31	4.29
93	Chi Rock Is & Pac Ry gen M 4s 1988	4.16	4.17	4.17	4.17	4.17	4.17	4.17	4.23	4.21	4.23	4.25	4.31	4.29
94	Atch Top & Santa Fe gen M 4s 1995	4.03	4.01	4.02	4.05	4.03	4.07	4.10	4.13	4.11	4.10	4.12	4.13	4.11
95	N Y Cent & Hudson River M 3 1/2s 1997	4.02	3.99	4.02	4.03	4.05	4.03	4.03	4.08	4.11	4.09	4.07	4.10	4.06
97	Lehigh Valley (N Y) 1st M 4 1/2s 1940	4.18	4.18	4.17	4.17	4.18	4.19	4.19	4.23	4.25	4.24	4.25	4.28	4.24
98	Louisville & Nash unified 4s 1940	4.05	4.03	4.05	4.05	4.04	4.06	4.09	4.13	4.13	4.13	4.16	4.15	4.08
99	Oregon RR & Nav Co cons M 4s 1946	4.24	4.22	4.25	4.25	4.24	4.27	4.32	4.42	4.41	4.39	4.38	4.43	4.38
100	Chi Bur & Q (Ill Div) M 3 1/2s 1949	4.15	4.15	4.17	4.18	4.18	4.18	4.17	4.25	4.34	4.32	4.28	4.30	4.30
101	Central Pacific 1st ref M 4s 1949	4.17	4.17	4.19	4.23	4.22	4.20	4.25	4.28	4.29	4.26	4.27	4.30	4.24
102	Nor Pac Ry prior lien lg M 4s 1997	4.01	4.01	4.03	4.04	4.04	4.05	4.07	4.11	4.11	4.09	4.09	4.10	4.09
103	Nor & West Ry 1st cons M 4s 1996	4.06	4.05	4.05	4.05	4.02	4.04	4.05	4.08	4.12	4.13	4.12	4.15	4.09
104	Central RR of N J gen M 5s 1987	4.05	4.04	4.06	4.07	4.08	4.12	4.11	4.13	4.18	4.18	4.19	4.20	4.18
105	Hocking Valley 1st cons M 4 1/2s 1999	4.40	4.40	4.39	4.41	4.43	4.44	4.47	4.48	4.47	4.45	4.48	4.48	4.45
106	N & W Ry Div 1st 1 & gen M 4s 1944	4.36	4.37	4.39	4.41	4.43	4.45	4.46	4.46	4.48	4.48	4.46	4.45	4.45
108	One Sh Linc RR cons 1st M 5s 1946	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.31	4.30	4.30	4.33	4.34	4.30
109	A T & S Fe Ry adj M 4s stamped 1995	4.35	4.34	4.38	4.40	4.42	4.43	4.46	4.49	4.53	4.54	4.55	4.58	4.57
110	Northern Pac Ry gen lien 3s 2047	4.35	4.32	4.33	4.33	4.35	4.37	4.38	4.39	4.38	4.37	4.40	4.44	4.44
111	Atl Coast Line 1st cons M 4s 1952	4.21	4.19	4.24	4.25	4.25	4.26	4.29	4.27	4.27	4.27	4.25	4.25	4.26
112	Del & Hudson Co 1st & ref M 4s 1943	4.07	4.05	4.05	4.07	4.04	4.04	4.03	4.06	4.12	4.09	4.12	4.12	4.08
113	Central of Georgia cons M 5s 1945	4.45	4.45	4.45	4.45	4.41	4.46	4.46	4.46	4.54	4.52	4.50	4.56	4.52
114	Pennsylvania RR cons M 4s 1950	3.82	3.80	3.85	3.83	3.82	3.82	3.81	3.83	3.85	3.92	3.90	3.90	3.90
115	Kansas City So Ry 1st M 3s 1950	4.44	4.43	4.44	4.48	4.52	4.52	4.48	4.52	4.57	4.57	4.56	4.55	4.60
116	L & N (Atl Knox & Cin Div) 4s 1955	4.37	4.36	4.37	4.38	4.40	4.39	4.43	4.40	4.42	4.44	4.43	4.43	4.43
117	Illinois Central RR ref M 4s 1955	4.10	4.18	4.21	4.22	4.22	4.21	4.25	4.29	4.34	4.31	4.24	4.26	4.24
118	Chic Burl & Quincy gen M 4s 1958	4.16	4.16	4.19	4.20	4.20	4.20	4.20	4.24	4.24	4.25	4.27	4.27	4.22
119	Southern Ry 1st cons M 5s 1994	4.63	4.61	4.63	4.64	4.65	4.65	4.65	4.68	4.71	4.70	4.71	4.72	4.68
120	Un Pac RR 1st lien & ref M 4s 2008	4.11	4.10	4.11	4.15	4.15	4.14	4.13	4.15	4.19	4.19	4.17	4.18	4.20
121	Atl Coast Line (L & N coll) 4s 1952	4.25	4.25	4.27	4.29	4.31	4.33	4.31	4.26	4.32	4.37	4.42	4.44	4.45
122	Nor & West (P C & C) joint 4s 1941	4.43	4.37	4.40	4.41	4.49	4.49	4.51	4.56	4.60	4.58	4.58	4.56	4.52
123	Crit Nor Ry 1st & ref M 4 1/2s 1961	4.19	4.18	4.19	4.21	4.22	4.21	4.23	4.23	4.24	4.24	4.24	4.25	4.24

RAILROAD BOND YIELDS

A85

YIELDS OF RAILROAD BONDS
Jan. 1913-Jun. 1914

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361.....	4.06	4.08	4.10	4.17	4.26	4.26	4.26	4.20	4.21	4.24	4.35	4.40	4.34
73	St. Paul Minn & Man cons M 4 1/2s 1933.....	4.21	4.24	4.33	4.26	4.32	4.32	4.32	4.40	4.38	4.38	4.52	4.60	4.50
76	Illinois Central RR coll M 4s 1952.....	4.24	4.27	4.34	4.26	4.32	4.32	4.32	4.40	4.38	4.38	4.52	4.60	4.50
78	Wabash RR Co 1st M 3s 1939.....	4.01	4.06	4.10	4.28	4.35	4.35	4.35	4.36	4.36	4.36	4.50	4.59	4.80
81	N Y Chic & St. Louis 1st M 4s 1937.....	4.06	4.10	4.10	4.28	4.35	4.35	4.35	4.36	4.36	4.36	4.50	4.59	4.80
82	Ches & Ohio Ry 1st cons 5s 1939.....	4.39	4.41	4.43	4.51	4.58	4.70	4.74	4.71	4.65	4.63	4.67	4.66	4.61
83	Ill Central (L N O & T) col 4s 1953.....	4.23	4.24	4.34	4.32	4.35	4.35	4.35	4.32	4.23	4.23	4.45	4.71	4.59
86	E Tenn V & G Ry con: 1st M 5s 1956.....	4.07	4.11	4.16	4.24	4.34	4.34	4.34	4.34	4.34	4.34	4.45	4.71	4.66
87	Chic Milw & St. Paul gen M 4s 1989.....	4.07	4.10	4.12	4.24	4.39	4.39	4.36	4.35	4.27	4.31	4.40	4.43	4.29
88	Lake Sh & Mich So 1st M 3 1/2s 1997.....	4.00	4.00	4.06	4.09	4.09	4.09	4.08	4.09	4.02	4.01	4.06	4.11	4.09
90	Baltimore & Ohio RR 1st M 4s 1948.....	4.14	4.17	4.24	4.33	4.44	4.50	4.53	4.47	4.44	4.44	4.53	4.52	4.40
91	Union Pac RR 1st M RR & Ig 4s 1947.....	4.05	4.06	4.16	4.26	4.36	4.42	4.53	4.32	4.31	4.31	4.30	4.28	4.19
92	Chicago & North Western RR 1st M 4s 1988.....	4.20	4.30	4.34	4.46	4.62	4.74	4.68	4.61	4.64	4.64	4.68	4.70	4.68
94	Atch Top & Santa Fe gen M 4s 1995.....	4.11	4.11	4.18	4.25	4.27	4.30	4.24	4.21	4.23	4.28	4.32	4.33	4.24
95	N Y Cent & Hudson River M 3 1/2s 1997.....	4.06	4.12	4.17	4.15	4.17	4.21	4.31	4.26	4.18	4.26	4.32	4.35	4.24
97	Lehigh Valley (N Y) 1st M 4 1/2s 1940.....	4.24	4.24	4.38	4.42	4.46	4.48	4.42	4.37	4.38	4.47	4.50	4.46	4.46
98	Louisville & Nash unified 4s 1940.....	4.08	4.14	4.23	4.33	4.40	4.48	4.48	4.44	4.42	4.40	4.48	4.51	4.38
99	Oregon RR & Nav Co cons M 4s 1946.....	4.38	4.36	4.35	4.50	4.47	4.53	4.43	4.53	4.43	4.47	4.69	4.53	4.44
100	Chi Bur & Q (Ill Div) M 3 1/2s 1949.....	4.30	4.32	4.36	4.36	4.42	4.40	4.40	4.41	4.32	4.42	4.53	4.55	4.43
101	Central Pacific 1st ref M 4s 1949.....	4.24	4.25	4.35	4.43	4.48	4.52	4.47	4.36	4.39	4.45	4.54	4.52	4.41
102	Nor Pac Ry 1st ref M 4s 1997.....	4.09	4.12	4.19	4.25	4.30	4.34	4.37	4.28	4.25	4.24	4.30	4.37	4.29
103	Nor & West Ry 1st cons M 4s 1996.....	4.09	4.09	4.21	4.25	4.30	4.44	4.33	4.29	4.27	4.31	4.30	4.31	4.22
104	Central RR of N J gen M 5s 1987.....	4.18	4.18	4.22	4.26	4.32	4.35	4.37	4.37	4.34	4.37	4.39	4.37	4.32
105	Hocking Valley 1st cons M 4 1/2s 1999.....	4.45	4.46	4.54	4.59	4.62	4.64	4.60	4.59	4.53	4.53	4.51	4.59	4.55
106	N & W Ry Div 1st l & gen M 4s 1944.....	4.45	4.47	4.51	4.51	4.62	4.69	4.71	4.68	4.66	4.69	4.70	4.72	4.63
107	Ore Sh Line RR cons 1st M 5s 1946.....	4.50	4.58	4.64	4.70	4.70	4.74	4.74	4.60	4.61	4.62	4.63	4.60	4.49
108	Southern Pac 1st ref M 4s 1955.....	4.45	4.53	4.58	4.72	4.73	4.80	4.75	4.71	4.63	4.63	4.75	4.78	4.65
109	A T & S Fe Ry adf M 4s stamped 1953.....	4.44	4.43	4.54	4.52	4.56	4.61	4.69	4.57	4.47	4.51	4.61	4.65	4.56
110	Northern Pac Ry gen len 3s 2047.....	4.44	4.43	4.54	4.52	4.56	4.61	4.69	4.57	4.47	4.51	4.61	4.65	4.56
111	Atl Coast Line 1st cons M 4s 1952.....	4.26	4.28	4.42	4.46	4.56	4.60	4.65	4.50	4.46	4.49	4.57	4.52	4.39
112	Del & Hudson Co 1st & ref M 4s 1943.....	4.08	4.06	4.15	4.25	4.23	4.31	4.36	4.35	4.27	4.25	4.32	4.35	4.34
113	Central of Georgia cons M 5s 1945.....	4.52	4.57	4.61	4.65	4.72	4.88	4.82	4.82	4.75	4.76	4.81	4.88	4.81
114	Pennsylvania RR cons M 4s 1948.....	3.90	3.90	3.93	4.00	4.03	4.03	4.03	4.02	4.00	4.01	4.07	4.06	4.01
115	Kansas City So Ry 1st M 3s 1950.....	4.60	4.61	4.69	4.75	4.80	4.80	4.73	4.73	4.73	4.78	4.89	4.86	4.85
116	L & N (Atl Knox & Cin Div) 4s 1955.....	4.43	4.40	4.45	4.58	4.61	4.63	4.67	4.58	4.63	4.63	4.70	4.66	4.60
117	Illinois Central RR ref M 4s 1955.....	4.27	4.29	4.36	4.36	4.50	4.58	4.52	4.52	4.52	4.50	4.58	4.57	4.45
118	Chi Bur & Quincy gen M 4s 1938.....	4.27	4.23	4.29	4.36	4.38	4.42	4.42	4.36	4.33	4.36	4.47	4.50	4.38
119	Southern Ry 1st cons M 5s 1944.....	4.68	4.71	4.76	4.78	4.81	4.88	4.90	4.86	4.81	4.83	4.85	4.87	4.82
120	Un Pac RR 1st len & ref M 4s 2008.....	4.20	4.25	4.32	4.34	4.40	4.45	4.36	4.33	4.32	4.34	4.39	4.45	4.34
121	Atl Coast Line (L & N coll) 4s 1952.....	4.45	4.51	4.54	4.59	4.66	4.72	4.67	4.63	4.59	4.64	4.67	4.75	4.49
122	Nor & West (P C & C) joint 4s 1941.....	4.52	4.56	4.64	4.72	4.78	5.01	5.01	4.92	4.84	4.80	4.79	4.75	4.66
123	Grt Nor Ry 1st & ref M 4 1/2s 1961.....	4.24	4.25	4.27	4.33	4.36	4.35	4.36	4.35	4.37	4.34	4.33	4.32	4.23

YIELDS OF RAILROAD BONDS
JAN. 1914—JAN. 1915

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361.	4.31	4.26	4.30	4.27	4.29	4.28	4.30	4.27				4.40	4.41
71	Union RR 1st M 4s 1939.	4.55	4.50	4.54	4.53	4.55	4.54	4.56	4.53				4.86	4.77
72	Waco RR 1st M 5s 1939.	4.80	4.69	4.74	4.74	4.75	4.75	4.80	4.75				5.15	5.11
81	N Y Chic & St Louis 1st M 4s 1937.	4.34	4.23	4.26	4.31	4.35	4.36	4.40	4.35				4.50	4.50
82	Ches & Ohio Ry 1st cons 5s 1939.	4.61	4.49	4.58	4.53	4.53	4.54	4.55	4.55				4.85	4.76
83	Ill Central (L N O & T) col 4s 1953.	4.52	4.49	4.55	4.61	4.67	4.58	4.67	4.67				4.80	4.80
86	E Tenn V & G Ry cons 1st M 5s 1956.	4.66	4.59	4.60	4.57	4.59	4.59	4.58	4.58				4.82	4.80
87	Chic & St Paul gen M 4s 1989.	4.69	4.17	4.15	4.10	4.06	4.04	4.12	4.12				4.76	4.73
88	Chic & St Paul 1st M 4s 1989.	4.69	4.17	4.15	4.10	4.06	4.04	4.12	4.12				4.76	4.73
90	Baltimore & Ohio RR 1st M 4s 1948.	4.40	4.27	4.34	4.32	4.34	4.35	4.40	4.35				4.68	4.56
91	Union Pac RR 1st M RR & Ig 4s 1947.	4.19	4.16	4.16	4.17	4.17	4.15	4.13	4.13				4.29	4.23
92	Chicago & Nor West gen M 3½s 1987.	4.31	4.23	4.26	4.29	4.27	4.25	4.30	4.29				4.49	4.43
93	Chi Rock Is & Pac Ry gen M 4s 1988.	4.68	4.40	4.59	4.60	4.61	4.54	4.78	4.78				4.94	4.86
94	Arch Top & Santa Fe gen M 4s 1955.	4.24	4.20	4.20	4.18	4.18	4.19	4.28	4.28				4.38	4.38
95	N Y Cent & Hudson River M 3½s 1997.	4.24	4.24	4.29	4.26	4.24	4.24	4.34	4.34				4.45	4.39
97	Lehigh Valley (N Y) 1st M 4½s 1940.	4.46	4.42	4.41	4.43	4.42	4.42	4.42	4.42				4.56	4.51
98	Louisville & Nash unified 4s 1940.	4.38	4.33	4.35	4.30	4.31	4.28	4.35	4.35				4.57	4.47
99	Oregon RR & Nav Co cons M 4s 1946.	4.44	4.37	4.45	4.41	4.39	4.41	4.42	4.42				4.57	4.56
100	Chi Bur & Q (Ill Div) M 3½s 1949.	4.43	4.35	4.41	4.34	4.29	4.29	4.39	4.39				4.64	4.58
101	Central Pacific 1st ref M 4s 1949.	4.41	4.35	4.40	4.35	4.35	4.35	4.47	4.47				4.83	4.83
102	Nor Pac Ry prior lien Ig M 4s 1997.	4.29	4.23	4.24	4.22	4.23	4.23	4.30	4.30				4.53	4.43
103	Nor & W Ry 1st cons M 4s 1996.	4.22	4.23	4.25	4.21	4.23	4.23	4.30	4.30				4.34	4.31
104	Central RR of N cons M 5s 1987.	4.32	4.26	4.26	4.23	4.23	4.23	4.25	4.25				4.42	4.37
105	Hocking Valley 1st cons M 4½s 1909.	4.55	4.49	4.50	4.51	4.53	4.49	4.51	4.51				4.79	4.78
106	N & W Ry Div 1st l & gen M 4s 1944.	4.63	4.54	4.58	4.59	4.60	4.58	4.56	4.56				4.83	4.76
107	Ore Sh Line RR cons 1st M 5s 1946.	4.60	4.53	4.54	4.55	4.53	4.56	4.58	4.58				4.82	4.75
108	Southern Pac 1st ref M 4s 1955.	4.48	4.39	4.40	4.41	4.40	4.40	4.51	4.51				4.87	4.80
109	A T & S Fe Ry adj M 4s stamped 1995.	4.65	4.56	4.61	4.58	4.60	4.58	4.63	4.63				4.76	4.76
110	Northern Pac Ry gen lien 5s 2027.	4.39	4.34	4.35	4.31	4.30	4.34	4.39	4.39				4.78	4.77
111	Atl Coast Line 1st cons M 4s 1952.	4.39	4.34	4.35	4.31	4.30	4.34	4.39	4.39				4.79	4.57
112	Del & Hudson Co 1st & ref M 4s 1943.	4.34	4.22	4.26	4.26	4.20	4.16	4.23	4.23				4.57	4.37
113	Central of Georgia cons M 5s 1945.	4.81	4.74	4.75	4.77	4.76	4.74	4.78	4.78				4.98	4.89
114	Pennsylvania RR cons M 4s 1948.	4.01	3.98	3.91	3.93	3.90	3.96	4.00	4.00				4.12	4.12
115	Kansas City So Ry 1st M 3s 1950.	4.85	4.76	4.78	4.79	4.77	4.81	4.79	4.79				4.74	4.94
116	L & N (Atl Knox & Cin Div) 4s 1955.	4.60	4.54	4.52	4.52	4.51	4.51	4.51	4.51				4.85	4.74
117	Illinois Central RR ref M 4s 1955.	4.45	4.34	4.32	4.35	4.30	4.40	4.45	4.45				4.79	4.76
118	Chic & St Paul RR 4s 1958.	4.38	4.33	4.31	4.35	4.35	4.35	4.40	4.40				4.56	4.49
119	Southern Ry 1st cons M 5s 1994.	4.82	4.74	4.73	4.75	4.75	4.76	4.82	4.82				5.07	5.01
120	Un Pac RR 1st lien & ref M 4s 2008.	4.34	4.27	4.27	4.27	4.26	4.23	4.25	4.25				4.52	4.48
121	Atl Coast Line (L & N coll) 4s 1952.	4.49	4.34	4.38	4.50	4.53	4.50	4.56	4.56				4.85	4.80
122	Nor & West (P C & C) Joint 4s 1941.	4.66	4.68	4.70	4.78	4.82	4.74	4.73	4.73				4.81	4.67
123	Grt Nor Ry 1st & ref M 4½s 1961.	4.23	4.22	4.24	4.22	4.22	4.23	4.24	4.24				4.27	4.24
124	Canada So 1st & ref cons 5s 1962.	4.74	4.66	4.67	4.66	4.63	4.63	4.67	4.67				4.89	4.88

RAILROAD BOND YIELDS

A87

YIELDS OF RAILROAD BONDS
JAN. 1915—JAN. 1916

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361.....	4.41	4.41	4.40	4.34	4.44	4.45	4.47	4.53	4.52	4.41	4.38	4.36	4.34
71	Illinois Central RR coll 4s 1952.....	4.77	4.81	4.87	4.82	4.83	4.87	4.95	5.13	5.04	4.94	4.84	4.63	4.65
78	Wabash RR Co 1st M 5s 1939.....	5.11	5.03	5.11	4.96	4.89	4.94	4.95	4.95	4.94	4.86	4.74	4.76	4.71
81	N Y Chic & St Louis 1st M 4s 1937.....	4.50	4.46	4.50	4.58	4.58	4.58	4.60	4.83	4.81	4.73	4.50	4.45	4.43
82	Ches & Ohio Ry 1st cons 5s 1939.....	4.76	4.74	4.75	4.75	4.70	4.69	4.80	4.82	4.83	4.63	4.62	4.60	4.59
83	Ill Central (L N O & T) col 4s 1953.....	4.80	4.80	4.80	4.91	5.01	4.99	5.18	5.18	5.19	4.98	4.83	4.81	4.80
86	Chic & Tenn Ry cons 1st M 4s 1936.....	4.80	4.76	4.79	4.76	4.78	4.80	4.85	4.89	4.89	4.81	4.72	4.73	4.70
87	Chic & Tenn Ry cons 1st M 4s 1939.....	4.48	4.44	4.47	4.43	4.43	4.49	4.63	4.69	4.68	4.60	4.41	4.34	4.33
88	Latic Sh & Mich So 1st M 3½s 1907.....	4.22	4.24	4.27	4.28	4.24	4.27	4.29	4.30	4.30	4.29	4.15	4.15	4.13
90	Baltimore & Ohio RR 1st M 4s 1948.....	4.56	4.65	4.69	4.60	4.65	4.73	4.85	4.84	4.83	4.72	4.55	4.51	4.46
91	Union Pac RR 1st M RR & lg 4s 1947.....	4.23	4.26	4.30	4.24	4.24	4.26	4.35	4.39	4.34	4.30	4.18	4.15	4.14
92	Chicago & Nor West gen M 3½s 1987.....	4.43	4.44	4.49	4.38	4.37	4.42	4.44	4.40	4.47	4.45	4.31	4.26	4.25
93	Chi Rock Is & Pac Ry gen M 4s 1988.....	4.86	4.83	4.87	4.83	4.87	4.87	4.92	5.04	4.92	4.74	4.53	4.75	4.76
94	Arch Top & Santa Fe gen M 4s 1995.....	4.28	4.32	4.35	4.26	4.30	4.37	4.41	4.41	4.41	4.34	4.26	4.27	4.24
95	N Y Cent & Hudson River M 3½s 1997.....	4.39	4.41	4.43	4.39	4.31	4.42	4.56	4.56	4.56	4.46	4.30	4.26	4.25
98	Louisville & Nash unified 4s 1940.....	4.47	4.48	4.52	4.41	4.47	4.51	4.66	4.59	4.66	4.54	4.41	4.37	4.33
99	Oregon RR & Nav Co cons M 4s 1946.....	4.56	4.54	4.61	4.56	4.62	4.69	4.72	4.71	4.75	4.61	4.46	4.48	4.48
100	Chi Bur & Q (Ill Div) M 3½s 1949.....	4.55	4.51	4.46	4.42	4.45	4.46	4.46	4.52	4.50	4.43	4.32	4.30	4.27
101	Central Pacific 1st ref M 4s 1949.....	4.70	4.76	4.76	4.67	4.71	4.77	4.84	4.94	4.90	4.79	4.61	4.56	4.55
102	Nor Pac Ry prior lien lg M 4s 1997.....	4.43	4.45	4.42	4.35	4.39	4.44	4.46	4.50	4.48	4.40	4.33	4.34	4.31
103	Nor & West Ry 1st cons M 4s 1996.....	4.31	4.34	4.36	4.33	4.35	4.42	4.55	4.58	4.48	4.37	4.31	4.29	4.28
104	Central RR of N J gen M 5s 1987.....	4.76	4.78	4.81	4.76	4.81	4.86	4.93	5.03	4.93	4.80	4.62	4.64	4.62
105	Hocking Valley 1st cons M 4½s 1999.....	4.76	4.78	4.81	4.76	4.81	4.86	4.93	5.03	4.93	4.80	4.62	4.64	4.62
106	Chic & Ky Ry 1st lg 4s 1994.....	4.75	4.78	4.81	4.76	4.81	4.86	4.93	5.03	4.93	4.80	4.62	4.64	4.62
107	Ore Sh Line RR cons 1st M 5s 1946.....	4.75	4.78	4.81	4.76	4.81	4.86	4.93	5.03	4.93	4.80	4.62	4.64	4.62
108	Southern Pac 1st ref M sf 4s 1955.....	4.75	4.81	4.86	4.73	4.72	4.81	4.88	4.88	4.88	4.78	4.59	4.53	4.52
109	A T & S Fe Ry adj M 4s stamped 1995.....	4.76	4.78	4.80	4.71	4.78	4.83	4.90	4.89	4.93	4.78	4.64	4.60	4.58
110	Northern Pac Ry gen lien 3s 2047.....	4.73	4.77	4.76	4.67	4.67	4.75	4.82	4.82	4.82	4.72	4.60	4.59	4.56
111	Atl Coast Line 1st cons M 4s 1952.....	4.51	4.45	4.41	4.49	4.49	4.52	4.59	4.73	4.84	4.60	4.39	4.40	4.35
112	Del & Hudson Co 1st & ref M 4s 1943.....	4.37	4.28	4.35	4.35	4.43	4.35	4.43	4.55	4.43	4.35	4.23	4.24	4.19
113	Central of Georgia cons M 5s 1945.....	4.89	4.91	4.91	4.92	4.97	5.04	5.04	5.09	5.20	5.10	4.94	4.94	4.94
114	Pennsylvania RR 1st M 4s 1948.....	4.12	4.12	4.11	4.13	4.13	4.13	4.09	4.17	4.17	4.08	4.02	4.03	4.02
115	Chic & Tenn Ry 1st M 3s 1930.....	4.94	4.90	4.93	4.93	4.93	4.93	4.95	4.99	5.02	4.72	4.72	4.77	4.77
116	L & N (Atl Knox & Cin Div) 4s 1955.....	4.74	4.63	4.66	4.72	4.71	4.72	4.85	4.89	4.92	4.88	4.65	4.70	4.62
117	Illinois Central RR ref M 4s 1955.....	4.76	4.74	4.78	4.70	4.70	4.73	4.75	4.80	4.95	4.80	4.56	4.54	4.57
118	Chic Burl & Quincy gen M 4s 1958.....	4.49	4.49	4.49	4.45	4.47	4.46	4.50	4.55	4.58	4.46	4.33	4.35	4.36
119	Southern Ry 1st cons M 5s 1994.....	5.01	5.03	5.06	5.03	5.01	5.03	5.04	5.07	5.15	5.02	4.88	4.85	4.85
120	Un Pac RR 1st lien & ref M 4s 2008.....	4.46	4.46	4.46	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43
121	Atl Coast Line (L & N coll) 4s 1952.....	4.60	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53	4.53
122	Nor & West (P & C) joint 4s 1941.....	4.67	4.73	4.77	4.77	4.75	4.80	4.85	4.88	4.91	4.86	4.66	4.69	4.68
123	Grt Nor Ry 1st & ref M 4½s 1961.....	4.24	4.28	4.42	4.32	4.28	4.28	4.44	4.46	4.52	4.30	4.26	4.28	4.26
124	Canada So 1st & ref cons 5s 1962.....	4.88	4.83	4.86	4.83	4.83	4.83	4.87	4.93	4.96	4.47	4.76	4.77	4.76
125	Morris & Essex 1st ref M 3½s 2000.....	4.17	4.16	4.16	4.12	4.12	4.12	4.13	4.13	4.14	4.14	4.09	4.06	4.05

YIELDS OF RAILROAD BONDS
JAN. 1916—JAN. 1917

Ref.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2161	4.34	4.36	4.34	4.37	4.40	4.40	4.42	4.48	4.43	4.36	4.33	4.35	4.30
76	Illinois Central RR coll 4s 1952	4.61	4.53	4.55	4.57	4.61	4.64	4.66	4.66	4.66	4.66	4.55	4.56	4.56
78	Wabash RR Co 1st M 5s 1939	4.71	4.67	4.68	4.72	4.69	4.73	4.73	4.75	4.73	4.65	4.60	4.60	4.56
82	Ches & Ohio Ry 1st cons 5s 1939	4.80	4.74	4.60	4.59	4.56	4.60	4.61	4.59	4.59	4.54	4.50	4.50	4.49
83	Ill Central (L N & T) col 4s 1953	4.81	4.81	4.81	4.81	4.81	4.81	4.81	4.80	4.80	4.80	4.71	4.75	4.67
86	E. Tenn V & C Ry cons 1st M 5s 1956	4.70	4.69	4.68	4.67	4.69	4.67	4.68	4.69	4.69	4.63	4.61	4.59	4.56
87	Atlantic City & Bay Ridge Ry 1st M 5s 1957	4.71	4.70	4.68	4.67	4.69	4.67	4.68	4.69	4.69	4.63	4.61	4.59	4.56
88	Lat Sh & Mich S Ry 1st M 5s 1957	4.71	4.70	4.68	4.67	4.69	4.67	4.68	4.69	4.69	4.63	4.61	4.59	4.56
90	Baltimore & Ohio RR 1st M 4s 1948	4.46	4.47	4.40	4.51	4.54	4.54	4.55	4.58	4.57	4.50	4.46	4.49	4.40
91	Union Pac RR 1st M RR & lg 4s 1947	4.14	4.14	4.15	4.19	4.19	4.16	4.18	4.19	4.21	4.13	4.05	4.08	4.04
92	Chicago & Nor West gen M 3 1/2s 1987	4.25	4.30	4.33	4.38	4.36	4.35	4.36	4.36	4.36	4.31	4.27	4.23	4.14
93	Chicago Rock Is & Pac Ry gen M 4s 1988	4.76	4.69	4.69	4.69	4.72	4.73	4.74	4.76	4.76	4.73	4.71	4.71	4.70
94	N. Y. & N. H. Ry 1st M 3 1/2s 1997	4.24	4.24	4.26	4.28	4.28	4.27	4.27	4.28	4.27	4.20	4.14	4.11	4.08
95	N. Y. & N. H. Ry 1st M 3 1/2s 1997	4.24	4.24	4.26	4.28	4.28	4.27	4.27	4.28	4.27	4.20	4.14	4.11	4.08
98	Louisville & Nash unified 4s 1940	4.33	4.30	4.35	4.40	4.38	4.36	4.38	4.42	4.42	4.32	4.31	4.25	4.20
99	Oregon RR & Nav Co cons M 4s 1946	4.48	4.54	4.49	4.49	4.48	4.46	4.46	4.46	4.47	4.48	4.43	4.40	4.36
100	Chi Bar & Q (Ill Div) M 3 1/2s 1949	4.27	4.28	4.33	4.33	4.35	4.35	4.41	4.42	4.41	4.41	4.30	4.28	4.18
101	Central Pacific 1st ref M 4s 1949	4.55	4.55	4.56	4.62	4.64	4.65	4.68	4.73	4.65	4.59	4.56	4.53	4.41
102	Nor Pac Ry prior lien lg M 4s 1997	4.31	4.29	4.31	4.35	4.36	4.37	4.38	4.41	4.38	4.33	4.28	4.27	4.21
103	Nor & West Ry 1st cons M 4s 1996	4.28	4.29	4.29	4.31	4.31	4.31	4.35	4.33	4.28	4.23	4.21	4.20	4.17
104	Central RR of N J gen M 5s 1987	4.24	4.22	4.21	4.23	4.23	4.22	4.26	4.27	4.27	4.25	4.22	4.21	4.13
105	Hocking Valley 1st cons M 4 1/2s 1969	4.82	4.74	4.73	4.74	4.76	4.86	4.93	4.97	4.94	4.92	4.87	4.89	4.84
106	N & W Ry Div 1st & gen M 4s 1944	4.61	4.59	4.60	4.62	4.65	4.70	4.69	4.72	4.59	4.61	4.54	4.52	4.46
107	Ore Sh Line RR cons 1st M 5s 1946	4.62	4.58	4.60	4.58	4.63	4.62	4.62	4.57	4.62	4.60	4.55	4.55	4.50
108	Southern Pac 1st ref M sf 4s 1955	4.52	4.52	4.53	4.55	4.55	4.54	4.55	4.55	4.55	4.49	4.42	4.41	4.33
109	A T & S Fe Ry adj M 4s stamped 1995	4.58	4.57	4.60	4.66	4.66	4.70	4.72	4.75	4.80	4.69	4.66	4.69	4.60
110	N. Y. & N. H. Ry 1st M 3 1/2s 1997	4.26	4.26	4.29	4.30	4.31	4.31	4.31	4.33	4.35	4.35	4.35	4.35	4.35
111	Del & Hudson Co 1st & ref M 4s 1943	4.19	4.19	4.18	4.15	4.15	4.15	4.07	4.12	4.08	4.10	4.06	4.10	4.03
112	Del & Hudson Co 1st & ref M 4s 1943	4.19	4.19	4.18	4.15	4.15	4.15	4.07	4.12	4.08	4.10	4.06	4.10	4.03
113	Central of Georgia cons M 5s 1945	4.94	4.90	4.95	4.96	4.95	4.95	4.95	4.98	4.98	4.96	4.85	4.88	4.84
114	Pennsylvania RR cons M 4s 1948	4.02	4.05	4.06	4.03	4.03	4.02	4.03	4.07	4.08	4.01	4.03	4.02	3.99
115	Kansas City So Ry 1st M 3s 1950	4.77	4.75	4.82	4.85	4.88	4.86	4.94	5.02	4.94	4.87	4.78	4.85	4.77
116	L & N (Atl Knox & Cin Div) 4s 1955	4.62	4.60	4.66	4.71	4.74	4.75	4.77	4.77	4.76	4.65	4.60	4.65	4.55
117	Illinois Central RR ref M 4s 1955	4.57	4.58	4.56	4.56	4.60	4.61	4.62	4.63	4.62	4.49	4.44	4.45	4.34
118	Chic Bk & Quincy gen M 4s 1938	4.36	4.32	4.36	4.36	4.37	4.38	4.40	4.37	4.36	4.34	4.32	4.33	4.23
119	Southern Ry 1st cons M 5s 1994	4.85	4.87	4.87	4.94	4.93	4.93	4.94	4.95	4.91	4.91	4.91	4.92	4.89
120	Un Pac RR 1st lien & ref M 4s 2008	4.43	4.41	4.43	4.43	4.45	4.47	4.46	4.46	4.43	4.38	4.35	4.38	4.28
121	Atl Coast Line (L & N coll) 4s 1952	4.76	4.77	4.79	4.80	4.82	4.84	4.95	4.96	4.79	4.74	4.75	4.68	4.68
122	Norfolk & West (P C & C) Joint 4s 1941	4.68	4.69	4.69	4.69	4.70	4.71	4.73	4.79	4.80	4.75	4.72	4.66	4.64
123	Grt Nor Ry 1st & ref M 4 1/2s 1961	4.26	4.26	4.27	4.27	4.28	4.27	4.26	4.26	4.28	4.24	4.25	4.23	4.18
124	Canada So 1st & ref cons 5s 1962	4.76	4.76	4.78	4.79	4.81	4.84	4.86	4.88	4.88	4.78	4.83	4.82	4.76
125	Morris & Essex 1st ref M 3 1/2s 2000	4.05	4.04	4.09	4.04	4.02	4.03	4.04	4.08	4.06	4.05	4.03	4.04	4.00
126	Pennsylvania RR cons M 4 1/2s 1960	4.23	4.20	4.22	4.24	4.25	4.25	4.26	4.27	4.27	4.21	4.20	4.18	4.13

RAILROAD BOND YIELDS

A89

YIELDS OF RAILROAD BONDS
JAN. 1917—JAN. 1918

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361	4.30	4.40	4.46	4.51	4.58	4.75	4.85	4.98	4.93	4.96	4.98	5.06	5.10
71	Illinois Central RR coll 4s 1952	4.52	4.66	4.64	4.66	4.66	4.94	5.22	5.20	5.20	5.39	5.56	5.67	5.60
72	Chicago & North Western RR 1st M 3½s 1917	4.52	4.66	4.64	4.66	4.66	4.94	5.22	5.20	5.20	5.39	5.56	5.67	5.60
73	Chicago & North Western RR 1st M 3½s 1919	4.49	4.48	4.59	4.85	4.80	4.86	4.90	4.98	4.98	5.00	5.06	5.28	5.46
82	Chicago & North Western RR 1st M 3½s 1919	4.49	4.48	4.59	4.85	4.80	4.86	4.90	4.98	4.98	5.00	5.06	5.28	5.46
83	Ill Central (L N O & T) col 4s 1953	4.67	4.74	4.79	4.99	5.06	5.06	5.11	5.37	5.59	5.63	5.72	5.78	5.69
86	E Tenn V & G Ry cons 1st M 5s 1956	4.56	4.59	4.62	4.63	4.63	4.91	5.00	5.08	5.21	5.08	5.40	5.47	5.31
88	Lake Sh & Mich So 1st M 3½s 1907	4.02	4.14	4.24	4.34	4.41	4.44	4.44	4.59	4.71	4.61	4.71	4.79	4.74
91	Union Pac RR 1st M RR & Ig 4s 1947	4.04	4.15	4.15	4.21	4.21	4.40	4.44	4.57	4.64	4.60	4.71	4.87	4.76
92	Chicago & North Western RR 1st M 3½s 1917	4.14	4.22	4.28	4.37	4.47	4.54	4.71	4.73	4.83	4.96	5.09	5.17	4.94
93	Chi Rock Is & Pac Ry gen M 4s 1988	4.56	4.53	4.56	4.77	4.90	5.01	5.01	5.06	5.09	5.09	5.40	5.47	5.36
94	Arch Top & Santa Fe gen M 4s 1905	4.19	4.23	4.26	4.35	4.40	4.48	4.55	4.59	4.68	4.68	4.85	4.90	4.78
95	N Y Cent & Hudson River M 3½s 1907	4.08	4.25	4.31	4.35	4.41	4.44	4.44	4.55	4.68	4.72	4.90	5.05	4.85
98	Louisville & Nash unified 4s 1940	4.20	4.33	4.37	4.45	4.59	4.59	4.64	4.78	4.96	4.96	5.02	5.11	5.00
99	Oregon RR & Nav Co cons M 4s 1946	4.36	4.39	4.54	4.55	4.77	4.80	4.87	4.90	4.92	4.92	5.38	5.45	5.32
100	Chi Bur & Q (Ill Div) M 3½s 1949	4.18	4.28	4.37	4.48	4.64	4.64	4.71	4.74	4.90	4.97	5.00	5.18	5.22
101	Central Pacific 1st ref M 4s 1949	4.41	4.56	4.61	4.78	4.82	4.96	5.06	5.08	5.23	5.27	5.33	5.43	5.31
102	Nor Pac Ry prior lien 1st M 4s 1997	4.71	4.72	4.72	4.76	4.76	4.76	4.76	4.76	4.76	4.81	4.93	4.93	4.84
103	Nor Pac Ry prior lien 1st M 4s 1996	4.71	4.72	4.72	4.76	4.76	4.76	4.76	4.76	4.76	4.81	4.93	4.93	4.84
104	Central RR of N Y 1st M 3½s 1917	4.13	4.21	4.23	4.30	4.40	4.57	4.54	4.55	4.55	4.69	4.90	4.92	4.87
105	Hocking Valley 1st cons M 4½s 1999	4.84	4.95	4.96	5.10	5.37	5.48	5.57	5.50	5.49	5.57	5.80	5.98	5.90
106	N & W Ry Div 1st 1 & gen M 4s 1944	4.46	4.48	4.56	4.69	4.86	4.98	4.95	5.13	5.37	5.55	5.33	5.71	5.95
107	Ore Sh Line RR cons 1st M 5s 1946	4.50	4.59	4.54	4.57	4.75	4.81	4.81	4.81	4.81	4.81	5.00	5.27	5.27
108	Southern Pac 1st ref M 4s 1955	4.33	4.42	4.48	4.61	4.76	4.82	4.81	4.80	4.94	5.16	5.16	5.36	5.17
109	A T & S Fe Ry adj M 4s stamped 1995	4.60	4.68	4.73	4.85	4.93	4.93	4.84	4.84	4.93	4.97	5.08	5.16	5.07
110	Northern Pac Ry gen 3s 2047	4.43	4.53	4.53	4.66	4.76	4.84	4.82	4.84	4.93	4.97	5.08	5.16	4.99
111	Atl Coast Line 1st cons M 4s 1952	4.26	4.38	4.45	4.54	4.68	4.71	4.69	4.71	4.84	5.11	5.12	5.17	5.02
112	Del & Hudson Co 1st & ref M 4s 1943	4.05	4.17	4.20	4.29	4.74	4.53	4.60	4.63	4.96	4.98	4.94	4.92	5.02
113	Central of Georgia cons M 5s 1945	4.84	4.93	5.00	5.07	5.19	5.15	5.21	5.20	5.20	5.50	5.87	5.84	5.78
114	Pennsylvania RR cons M 4s 1948	3.99	3.98	4.02	4.04	4.22	4.31	4.44	4.47	4.49	4.47	4.68	4.68	4.68
115	Kansas City So Ry 1st M 3s 1950	4.77	4.86	4.91	5.08	5.29	5.65	5.63	5.60	5.60	5.70	5.79	5.86	5.86
116	L & N (Atl Knox & Cin Div) 4s 1955	4.55	4.63	4.73	4.94	5.04	4.99	5.04	5.08	5.10	5.15	5.21	5.25	5.37
117	Illinois Central RR ref 4s 1953	4.55	4.63	4.73	4.94	5.04	4.99	5.04	5.08	5.10	5.15	5.21	5.25	5.37
118	Chicago & North Western RR 1st M 3½s 1917	4.73	4.78	4.82	4.88	4.94	5.01	5.01	5.01	5.01	5.22	5.38	5.47	5.46
119	Southern Ry 1st M 3s 1904	4.80	4.93	4.95	5.03	5.14	5.08	5.12	5.13	5.22	5.38	5.39	5.47	5.46
120	Un Pac RR 1st lien & ref M 4s 2008	4.28	4.31	4.34	4.43	4.50	4.63	4.68	4.70	4.84	4.94	5.09	5.17	5.18
121	Atl Coast Line (L & N coll) 4s 1952	4.68	4.88	4.94	5.04	5.11	5.15	5.40	5.29	5.38	5.39	5.63	5.90	6.02
122	Norfolk & West (P & C) Joint 4s 1941	4.50	4.64	4.73	4.84	4.94	4.96	4.93	5.00	5.15	5.30	5.13	5.18	5.17
123	Grt Nor Ry 1st & ref M 4½s 1961	4.24	4.26	4.42	4.57	4.64	4.84	4.48	4.44	4.48	4.73	4.85	4.96	4.98
124	Canada So 1st & ref cons 4s 1962	4.76	4.78	4.82	4.97	5.00	5.01	5.06	5.01	5.07	5.13	5.44	5.70	5.83
125	Morris & Essex 1st ref M 3½s 2000	4.00	4.04	4.07	4.10	4.18	4.20	4.39	4.39	4.44	4.54	4.55	4.51	4.81
126	Pennsylvania RR cons M 4½s 1960	4.15	4.21	4.25	4.27	4.33	4.44	4.44	4.43	4.48	4.49	4.63	4.64	4.61

YIELDS OF RAILROAD BONDS
JAN. 1916—JAN. 1917

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2d41	4.34	4.36	4.34	4.37	4.40	4.40	4.42	4.48	4.43	4.36	4.33	4.35	4.30
71	Union RR RR 1st M 4s 1952	4.65	4.53	4.55	4.57	4.61	4.64	4.66	4.66	4.66	4.65	4.55	4.56	4.56
72	Wabash RR Co 1st M 5s 1919	4.71	4.67	4.68	4.72	4.72	4.72	4.73	4.75	4.73	4.65	4.60	4.60	4.56
73	Ches & Ohio Ry 1st cons 4s 1939	4.59	4.64	4.60	4.59	4.56	4.60	4.61	4.59	4.59	4.54	4.50	4.59	4.49
82	Ill Central (L N & T) col 4s 1953	4.80	4.77	4.81	4.81	4.81	4.81	4.83	4.86	4.85	4.84	4.71	4.75	4.67
86	E Tenn V & G Ry cons 1st M 5s 1956	4.70	4.69	4.68	4.67	4.69	4.67	4.68	4.69	4.69	4.63	4.61	4.59	4.56
87	Chic Milw & St Paul gen M 4s 1989	4.33	4.32	4.36	4.36	4.36	4.37	4.36	4.37	4.36	4.36	4.36	4.32	4.26
88	Lake Sh & Mich RR 1st M 4s 1938	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43
89	Chic & N York RR 1st M 4s 1948	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43	4.43
91	Union Pac RR 1st M RR & lg 4s 1947	4.14	4.14	4.15	4.16	4.19	4.16	4.18	4.19	4.21	4.13	4.05	4.08	4.04
92	Chicago & Nor West gen M 3 1/2s 1987	4.25	4.30	4.33	4.38	4.36	4.35	4.35	4.36	4.38	4.31	4.27	4.23	4.14
93	Chic Rock Is & Pac Ry gen M 4s 1988	4.76	4.69	4.69	4.72	4.73	4.74	4.76	4.84	4.86	4.84	4.73	4.63	4.55
94	Atch Ton & Santa Fe gen M 4s 1905	4.24	4.23	4.26	4.30	4.30	4.31	4.32	4.33	4.33	4.33	4.33	4.33	4.33
95	N Y Cent & Hudson River M 3 1/2s 1997	4.25	4.25	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26	4.26
96	Louisville & Nash unified 4s 1940	4.33	4.30	4.35	4.40	4.39	4.36	4.38	4.42	4.44	4.32	4.31	4.25	4.20
99	Oregon RR & Nav Co cons M 4s 1946	4.48	4.54	4.49	4.49	4.49	4.46	4.46	4.50	4.47	4.48	4.43	4.40	4.36
100	Chi Bar & O (Ill Div) M 3 1/2s 1949	4.27	4.28	4.33	4.33	4.35	4.35	4.35	4.41	4.42	4.41	4.40	4.38	4.18
101	Central Pacific 1st ref M 4s 1949	4.55	4.55	4.56	4.62	4.64	4.65	4.68	4.73	4.65	4.59	4.56	4.53	4.41
102	Nor Pac Ry prior lien 1st M 4s 1997	4.31	4.29	4.31	4.35	4.36	4.37	4.38	4.41	4.38	4.33	4.28	4.27	4.21
103	Nor & West Ry 1st cons M 4s 1996	4.28	4.29	4.31	4.31	4.31	4.31	4.33	4.33	4.33	4.28	4.23	4.21	4.20
104	Central RR of N J gen M 5s 1987	4.24	4.22	4.21	4.23	4.23	4.22	4.26	4.27	4.27	4.25	4.22	4.22	4.13
105	N & W Ry 1st M 4s 1909	4.61	4.59	4.60	4.62	4.65	4.70	4.86	4.93	4.91	4.94	4.87	4.89	4.84
106	N & W Ry Div 1st M 4s 1944	4.61	4.59	4.60	4.62	4.65	4.70	4.86	4.93	4.91	4.94	4.87	4.89	4.84
107	Ors Sh Line RR cons 1st M 5s 1946	4.62	4.58	4.57	4.58	4.63	4.62	4.62	4.62	4.57	4.62	4.55	4.55	4.50
108	Southern Pac 1st ref M 4s 1955	4.52	4.52	4.53	4.55	4.54	4.55	4.55	4.55	4.55	4.49	4.42	4.41	4.33
109	A T & S Fe Ry adj M 4s stamped 1995	4.58	4.57	4.60	4.66	4.70	4.72	4.75	4.80	4.77	4.69	4.66	4.69	4.60
110	Northern Pac Ry gen lien 3s 2047	4.56	4.56	4.57	4.57	4.56	4.56	4.56	4.59	4.59	4.54	4.54	4.52	4.43
111	Atl Coast Line 1st cons M 4s 1952	4.35	4.40	4.42	4.41	4.41	4.41	4.41	4.43	4.43	4.43	4.43	4.43	4.43
112	Del & Hudson Co 1st & ref M 4s 1943	4.49	4.49	4.49	4.49	4.49	4.49	4.49	4.49	4.49	4.49	4.49	4.49	4.49
113	Central of Georgia cons M 3s 1945	4.94	4.90	4.95	4.96	4.95	4.95	4.98	4.98	4.96	4.89	4.85	4.88	4.84
114	Pennsylvania RR cons M 4s 1948	4.02	4.05	4.06	4.03	4.03	4.02	4.03	4.07	4.08	4.01	4.03	4.02	3.99
115	Kansas City So Ry 1st M 3s 1950	4.77	4.70	4.66	4.85	4.88	4.86	4.94	5.02	4.94	4.87	4.80	4.85	4.77
116	L & N (Atl Knox & Cin Div) 4s 1955	4.62	4.60	4.66	4.71	4.77	4.75	4.77	4.77	4.76	4.65	4.68	4.65	4.55
117	Illinois Central RR ref M 4s 1955	4.57	4.58	4.56	4.58	4.60	4.61	4.62	4.63	4.62	4.49	4.44	4.45	4.34
118	Chic Burl & Quincy gen M 4s 1958	4.36	4.36	4.36	4.36	4.36	4.37	4.38	4.40	4.34	4.36	4.32	4.33	4.23
119	Southern Ry 1st cons M 5s 1994	4.85	4.87	4.87	4.94	4.93	4.93	4.94	4.95	4.95	4.91	4.91	4.92	4.89
120	Un Pac RR 1st M 4s 2008	4.85	4.81	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83	4.83
121	Atl Coast Line (L & N coll) 4s 1952	4.76	4.77	4.79	4.80	4.82	4.84	4.84	4.95	4.96	4.79	4.74	4.75	4.68
122	Nor & West (P C & C) joint 4s 1941	4.68	4.69	4.69	4.70	4.73	4.73	4.79	4.80	4.75	4.72	4.66	4.64	4.50
123	Grt Nor Ry 1st & ref M 4 1/2s 1961	4.26	4.26	4.27	4.27	4.28	4.27	4.26	4.26	4.28	4.24	4.25	4.23	4.18
124	Canada So 1st & ref cons 5s 1962	4.76	4.76	4.78	4.79	4.84	4.81	4.86	4.88	4.88	4.87	4.83	4.82	4.76
125	Morris & Essex 1st ref M 3 1/2s 2000	4.05	4.00	4.00	4.01	4.02	4.03	4.04	4.08	4.06	4.05	4.05	4.04	4.00
126	Pennsylvania RR cons M 4 1/2s 1960	4.22	4.20	4.22	4.24	4.25	4.25	4.26	4.27	4.27	4.21	4.20	4.18	4.15

RAILROAD BOND YIELDS

A89

YIELDS OF RAILROAD BONDS
JAN. 1917—JAN. 1918

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361.....	4.30	4.40	4.46	4.51	4.58	4.75	4.85	4.88	4.93	4.96	4.98	5.06	5.10
71	Illinois Central RR coll 4s 1952.....	4.52	4.56	4.64	4.76	4.84	5.03	5.27	5.29	5.39	5.46	5.56	5.67	5.60
72	Wabash RR Co 1st M 5s 1939.....	4.56	4.61	4.68	4.80	4.93	4.96	5.00	4.98	5.02	5.15	5.26	5.37	5.46
73	Che & Ohio Ry 1st cons 5s 1939.....	4.49	4.74	4.79	4.89	4.98	5.06	5.11	5.37	5.39	5.63	5.72	5.78	5.69
82	Ill Central (L & N) col 4s 1953.....	4.67	4.74	4.79	4.85	5.06	5.06	5.11	5.37	5.39	5.63	5.72	5.78	5.69
86	E Tenn V & G Ry cons 1st M 5s 1956.....	4.56	4.59	4.63	4.64	5.01	4.99	5.00	5.08	5.21	5.08	5.40	5.47	5.41
88	Lake Sh & Mich So 1st M 3½s 1907.....	4.02	4.14	4.13	4.24	4.41	4.44	4.44	4.50	4.61	4.70	4.71	4.79	4.76
91	Union Pac RR 1st M RR & lg 4s 1947.....	4.04	4.15	4.15	4.21	4.40	4.44	4.51	4.57	4.64	4.60	4.71	4.87	4.76
92	Chicago & Nor West gen M 3½s 1987.....	4.14	4.22	4.28	4.37	4.47	4.54	4.73	4.73	4.63	4.66	4.96	4.97	4.94
93	Chi Rock Is & Pac Ry gen M 4s 1988.....	4.55	4.58	4.77	4.90	5.01	5.01	4.99	5.00	5.09	5.19	5.40	5.41	5.36
94	Mich Top & Santa Fe gen M 4s 1995.....	4.19	4.23	4.36	4.40	4.48	4.48	4.48	4.55	4.68	4.68	4.85	4.90	4.88
98	N V C & Hudson River 4½s 1997.....	4.18	4.23	4.37	4.43	4.43	4.43	4.43	4.55	4.68	4.72	5.02	5.05	4.96
99	Louisville & N. Ky 1st M 4s 1940.....	4.20	4.33	4.37	4.38	4.59	4.59	4.64	4.78	4.96	4.96	5.05	5.11	5.00
100	Oregon RR & Nav Co cons M 4s 1946.....	4.36	4.39	4.51	4.55	4.77	4.80	4.87	4.90	4.90	4.92	5.38	5.45	5.32
101	Chi RR & Q (Ill Div) M 3½s 1949.....	4.18	4.28	4.37	4.48	4.64	4.64	4.71	4.74	4.92	4.97	5.00	5.48	5.22
102	Central Pacific 1st ref M 4s 1949.....	4.41	4.56	4.61	4.78	4.82	4.96	5.06	5.08	5.23	5.27	5.33	5.43	5.31
103	Nor Pac Ry prior lien M 4s 1997.....	4.21	4.25	4.30	4.41	4.49	4.60	4.63	4.68	4.77	4.81	4.93	4.89	4.81
104	Nor & West Ry 1st cons M 4s 1996.....	4.17	4.22	4.35	4.31	4.39	4.58	4.56	4.66	4.78	4.81	4.96	4.89	4.78
105	Central RR of N J gen M 3s 1987.....	4.33	4.43	4.53	4.60	4.73	4.73	4.73	4.83	4.93	4.93	5.03	5.03	4.93
106	Hocking Valley 1st cons M 4½s 1999.....	4.84	4.95	4.95	5.10	5.37	5.48	5.57	5.50	5.49	5.57	5.80	5.87	5.90
106	N & W Ry Div 1st & gen M 4s 1944.....	4.46	4.48	4.56	4.69	4.75	4.98	4.98	5.13	5.37	5.55	5.33	5.71	5.95
107	Ore Sh Line RR cons 1st M 5s 1946.....	4.50	4.59	4.54	4.57	4.75	4.81	4.81	4.81	4.81	5.00	5.26	5.27	5.27
108	Southern Pac 1st ref M sf 4s 1955.....	4.33	4.42	4.48	4.61	4.76	4.82	4.81	4.80	4.94	4.93	5.16	5.36	5.17
109	A T & S Fe Ry adj M 4s stamped 1995.....	4.60	4.68	4.73	4.85	4.93	4.90	4.90	4.92	5.04	5.10	5.47	5.44	5.37
110	Northern Pac Ry gen lien 3s 2047.....	4.43	4.53	4.53	4.66	4.76	4.84	4.82	4.84	4.95	4.97	5.08	5.19	4.99
111	All Coast Line 1st cons M 4s 1952.....	4.26	4.38	4.45	4.54	4.68	4.71	4.69	4.71	4.84	5.11	5.12	5.17	5.02
112	Del & Hudson RR 1st M 4s 1943.....	4.05	4.17	4.20	4.29	4.74	4.53	4.60	4.63	4.96	4.98	4.94	4.92	5.02
113	Central of Georgia cons M 5s 1943.....	4.84	4.93	5.00	5.07	5.19	5.19	5.15	5.21	5.20	5.50	5.87	5.84	5.78
114	Pennsylvania RR cons M 4s 1948.....	3.99	3.98	4.02	4.04	4.22	4.31	4.44	4.47	4.49	4.60	4.68	4.68	4.68
115	Kansas City So Ry 1st M 3s 1950.....	4.17	4.86	4.91	5.08	5.29	5.65	5.63	5.60	5.70	5.60	5.70	5.79	5.86
116	L & N (Atl Knox & Cin Div) 4s 1955.....	4.55	4.63	4.73	4.94	5.04	4.99	5.04	5.08	5.10	5.15	5.47	5.61	5.37
117	Illinois Central RR ref 4s 1955.....	4.34	4.39	4.48	4.78	4.70	4.77	4.81	4.89	5.04	5.25	5.25	5.25	5.25
118	Citic Burt & Quincy gen M 4s 1958.....	4.23	4.28	4.42	4.48	4.54	4.52	4.54	4.54	4.64	4.64	4.87	5.03	5.03
119	Southern Ry 1st cons M 5s 1993.....	4.28	4.33	4.39	4.53	4.71	4.68	4.68	4.71	5.02	5.38	5.39	5.47	5.47
120	Nor Pac Ry 1st cons M 4s 2008.....	4.28	4.31	4.34	4.43	4.50	4.62	4.68	4.70	4.84	4.94	5.09	5.17	5.18
121	Atl Coast Line (L & N coll) 4s 1952.....	4.68	4.88	4.94	5.04	5.11	5.15	5.40	5.29	5.38	5.50	5.65	5.90	6.02
122	Nor & West (P C & C) Joint 4s 1941.....	4.50	4.64	4.73	4.84	4.94	4.96	4.93	5.00	5.15	5.70	5.13	5.18	5.17
123	Grt Nor Ry 1st & ref M 4½s 1961.....	4.18	4.24	4.26	4.42	4.57	4.54	4.48	4.44	4.48	4.73	4.85	4.96	4.98
124	Canada So 1st & ref cons 5s 1962.....	4.76	4.78	4.82	4.97	5.01	5.06	5.01	5.06	5.01	5.13	5.44	5.70	5.83
125	Morris & Essex 1st ref M 3½s 2000.....	4.00	4.04	4.07	4.10	4.18	4.20	4.39	4.39	4.44	4.54	4.55	4.51	4.81
126	Pennsylvania RR cons M 4½s 1960.....	4.15	4.21	4.25	4.27	4.33	4.44	4.44	4.43	4.48	4.49	4.63	4.64	4.61

YIELDS OF RAILROAD BONDS
JAN. 1918—JAN. 1919

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361	5.10	5.17	5.13	5.21	5.15	5.33	5.43	5.40	5.50	5.26	4.92	4.98	4.91
71	Illinois Central RR col 4s 1952	5.60	5.40	5.40	5.64	5.49	5.47	5.42	5.46	5.54	5.54	5.18	5.28	5.38
72	Wabash RR Co 1st M 5s 1939	5.46	5.43	5.51	5.57	5.49	5.46	5.65	5.71	5.76	5.53	5.28	5.31	5.20
82	Ches & Ohio Ry 1st cons 5s 1939	5.18	5.12	5.26	5.34	5.27	5.25	5.33	5.41	5.38	5.31	5.10	4.99	5.09
83	Ill Central (L N O & T) col 4s 1953	5.69	5.59	5.57	5.65	5.62	5.66	5.83	5.71	5.82	5.65	5.30	5.30	5.54
86	El Tren V & G Ry cons 1st M 5s 1956	5.37	5.46	5.15	5.34	5.34	5.22	5.49	5.80	5.50	5.51	5.34	5.30	5.30
87	Union Pac RR 1st M 4s 1947	4.76	4.81	4.82	4.77	4.79	4.84	4.83	4.95	4.96	4.94	4.84	4.63	4.84
91	Union Pac RR 1st M 4s 1947	4.76	4.81	4.82	4.77	4.79	4.84	4.83	4.95	4.96	4.94	4.84	4.63	4.84
92	Chicago & Nor West gen M 3 1/2s 1987	4.94	4.89	5.00	5.07	5.23	5.23	5.08	5.25	5.23	5.23	4.83	4.53	5.78
93	Chl Rock Is & Pac Ry gen M 4s 1988	5.36	5.23	5.37	5.39	5.35	5.44	5.45	5.36	5.54	5.40	4.97	5.03	5.22
94	Atch Top & Santa Fe gen 1 4s 1995	4.78	4.79	4.93	4.98	4.94	4.98	4.97	4.96	5.03	4.85	4.62	4.71	4.76
95	N Y Cent & Hudson River M 3 1/2s 1997	4.86	4.90	4.93	5.01	5.00	5.05	4.99	5.02	5.06	4.95	4.68	4.81	4.91
98	Louisville & Nash unlted 4s 1940	5.00	4.96	5.19	5.23	4.98	5.11	5.26	5.25	5.35	5.22	4.95	4.82	5.04
99	Union Pac RR 1st M 4s 1947	5.22	5.20	5.39	5.40	5.39	5.40	5.53	5.51	5.49	5.43	5.09	4.97	4.97
100	Chl Bur & Q (Ill Div) M 3 1/2s 1949	5.22	5.16	5.19	5.22	5.13	5.24	5.36	5.33	5.33	5.25	4.92	4.86	5.09
101	Central Pacific 1st ref M 4s 1949	5.31	5.25	5.30	5.41	5.25	5.33	5.46	5.48	5.61	5.38	4.96	5.09	5.22
102	Nor Pac Ry prior lien 1st M 4s 1997	4.81	4.85	5.01	5.04	4.99	5.05	5.00	5.02	5.02	4.90	4.65	4.69	4.76
103	Nor & West Ry 1st cons M 4s 1996	4.78	4.78	4.89	4.87	4.85	5.01	4.95	5.01	5.04	4.88	4.58	4.63	4.79
104	Central RR of N J gen M 5s 1987	4.87	4.82	4.82	4.82	4.92	4.92	4.95	4.96	4.92	4.92	4.65	4.82	4.82
105	Hocking Valley 1st cons M 4 1/2s 1999	5.90	5.89	5.90	5.96	5.96	5.96	5.90	6.00	5.98	5.86	5.37	5.36	5.57
106	N & W Ry Div 1st 1 & gen M 4s 1944	5.95	5.83	5.77	5.80	5.64	5.60	6.11	5.78	5.70	5.59	5.06	5.04	5.29
107	Q S Ry RR cons 1st M 5s 1946	5.17	5.24	5.37	5.33	5.23	5.33	5.36	5.44	5.39	5.28	5.21	5.05	5.11
108	Southern Pac 1st M 4s 1955	5.17	5.24	5.37	5.33	5.23	5.33	5.36	5.44	5.39	5.28	5.21	5.05	5.11
109	A T & S Fe Ry adj M 4s 1949	5.37	5.31	5.52	5.45	5.33	5.43	5.46	5.44	5.40	5.30	4.91	5.04	5.18
110	Northern Pac Ry gen lien 3s 2047	4.99	5.02	5.19	5.28	5.15	5.13	5.03	5.14	5.25	5.09	4.88	4.93	4.97
111	Atl Coast Line 1st cons M 4s 1952	5.02	4.98	5.05	5.08	5.10	5.27	5.39	5.32	5.31	5.14	4.81	4.95	4.95
112	Del & Hudson Co 1st & ref M 4s 1943	5.02	5.22	5.13	5.36	5.23	5.25	5.31	5.46	5.50	5.30	4.90	5.01	5.07
113	Central of Georgia cons M 5s 1945	5.78	5.74	5.87	5.88	5.81	5.95	6.06	5.89	6.02	5.77	5.45	5.44	5.40
114	Pennsylvania RR cons M 4s 1948	4.68	4.78	4.85	4.90	4.90	4.95	4.98	5.01	5.05	5.06	4.49	4.70	4.82
115	Kansas City So Ry 1st M 3s 1950	5.86	5.67	5.81	5.86	5.62	5.56	5.80	5.70	5.84	5.63	5.44	5.42	5.54
116	L & N (Atl Knox & Cin Div) 4s 1955	5.37	5.41	5.41	5.60	5.42	5.23	5.38	5.38	5.54	5.53	5.16	5.06	5.37
117	Illinois Central RR ref M 4s 1953	5.25	5.04	5.15	5.26	5.28	5.28	5.40	5.40	5.40	5.40	5.40	5.40	5.40
118	Chic Burl & Quincy gen M 4s 1958	5.03	4.95	4.99	5.09	5.04	5.15	5.16	5.19	5.21	5.21	5.16	5.21	5.21
119	Southern Ry 1st cons M 5s 1994	5.46	5.41	5.46	5.43	5.41	5.59	5.61	5.70	5.70	5.46	5.16	5.21	5.21
120	Un Pac RR 1st lien & ref M 4s 2008	5.18	5.01	5.03	5.08	5.05	5.16	5.09	5.09	5.14	4.99	4.71	4.75	4.91
121	Atl Coast Line (L & N coll) 4s 1952	6.02	5.89	5.99	5.96	5.85	6.04	6.03	5.92	6.00	5.74	5.29	5.39	5.40
122	Nor & West (P & C) Joint 4s 1941	5.17	5.09	5.25	5.41	5.45	5.45	5.63	5.73	5.87	5.74	5.29	5.39	5.41
123	Grt Nor Ry 1st & ref M 4 1/2s 1961	4.98	4.89	4.92	4.98	4.84	4.98	4.99	4.97	5.02	4.98	4.76	4.76	4.97
124	Canada So 1st & ref cons 5s 1960	5.83	5.56	5.56	5.62	5.53	5.83	5.83	5.86	5.89	5.83	5.13	5.27	5.26
125	Morris & Essex 1st ref M 3 1/2s 2000	4.81	4.71	4.69	4.67	4.60	4.60	4.68	4.68	4.73	4.63	4.36	4.43	4.56
126	Pennsylvania RR cons M 4 1/2s 1960	4.61	4.62	4.67	4.67	4.67	4.73	4.77	4.79	4.85	4.80	4.60	4.66	4.74

RAILROAD BOND YIELDS

A91

YIELDS OF RAILROAD BONDS
Jan. 1919—Jan. 1920

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361.....	4.91	5.05	5.25	5.32	5.14	5.04	5.14	5.48	5.32	5.29	5.54	5.80	5.51
71	Illinois Central RR coll 4s 1952.....	5.38	5.50	5.53	5.56	5.48	5.46	5.45	5.47	5.77	5.63	5.87	5.91	5.89
76	Wabash RR Co 1st M 5s 1939.....	5.23	5.23	5.39	5.49	5.36	5.33	5.47	5.82	5.85	5.60	5.80	5.91	5.86
82	Ches & Ohio Ry 1st cons 5s 1939.....	5.09	5.15	5.18	5.18	5.16	5.14	5.25	5.37	5.46	5.35	5.50	5.60	5.15
83	Ill Central (L N O & T) col 4s 1953.....	5.59	5.56	5.69	5.78	5.60	5.57	5.72	6.04	5.97	5.86	6.16	6.15	6.15
86	Tenn V & G Ry cons 1st M 5s 1956.....	5.30	5.28	5.34	5.25	5.24	5.30	5.24	5.65	5.64	5.47	5.58	5.66	5.64
87	Lake Erie & W Ry 1st M 4s 1929.....	4.84	4.85	4.88	4.89	4.88	4.89	4.88	4.98	5.10	4.91	5.01	5.10	5.07
91	Ill Central RR 1st M 4s 1947.....	4.78	4.88	4.92	4.89	4.89	4.93	5.00	5.05	5.09	4.97	5.05	5.11	5.14
92	Chicago & North Western RR 1st M 3 1/2s 1947.....	5.00	5.04	5.04	5.04	5.02	5.03	5.07	5.32	5.19	5.20	5.20	5.25	5.34
93	Chi Rock Is & Pac Ry gen M 4s 1988.....	5.22	5.22	5.14	5.29	5.31	5.31	5.44	5.61	5.56	5.51	5.55	5.57	5.47
94	Atch Top & Santa Fe gen M 4s 1905.....	4.76	4.86	4.86	4.94	4.88	4.93	5.03	5.17	5.13	5.03	5.18	5.09	5.05
95	N Y Cent & Hudson River M 3 1/2s 1997.....	4.91	4.90	4.90	4.98	4.94	4.95	4.98	5.14	5.11	4.98	5.22	5.23	5.22
98	Louisville & Nash uninf'd 4s 1940.....	5.04	5.15	5.22	5.21	5.11	5.15	5.19	5.30	5.24	5.14	5.26	5.38	5.31
99	Oregon RR & Nav Co cons M 4s 1946.....	5.07	5.07	5.25	5.25	5.26	5.11	5.15	5.35	5.21	5.16	5.29	5.43	5.51
100	Chi Bur & Q (Ill Div) M 3 1/2s 1949.....	5.09	5.12	5.23	5.21	5.06	5.10	5.18	5.39	5.25	5.14	5.21	5.22	5.26
101	Central Pacific 1st ref M 4s 1949.....	5.22	5.29	5.42	5.41	5.34	5.37	5.55	5.82	5.71	5.58	5.77	5.66	5.73
102	Nor Pac prior lien M 4s 1907.....	4.76	4.78	4.84	4.90	4.87	4.93	5.04	5.19	5.24	5.12	5.27	5.18	5.22
103	Nor & West Ry 1st cons M 4s 1996.....	4.79	4.76	4.78	4.85	4.92	4.97	4.98	5.04	5.13	5.04	5.11	5.17	5.17
104	Central RR of N J gen M 5s 1987.....	4.82	4.87	4.87	4.87	4.89	4.87	4.89	4.95	4.96	4.93	4.95	4.95	4.99
105	Hocking Valley 1st cons M 4 1/2s 1999.....	5.57	5.70	5.74	5.79	5.89	5.76	5.82	6.05	6.31	6.16	6.39	6.44	6.37
106	N & W Ry Div 1st & gen M 4s 1944.....	5.29	5.36	5.44	5.48	5.42	5.38	5.41	5.77	5.76	5.60	5.52	5.68	5.78
107	Ore Sh Line RR cons 1st M 5s 1946.....	5.11	5.11	5.17	5.20	5.20	5.17	5.26	5.40	5.46	5.41	5.45	5.55	5.53
108	Southern Pac 1st ref M 4s 1958.....	5.04	5.11	5.17	5.20	5.20	5.17	5.26	5.40	5.46	5.41	5.45	5.55	5.53
109	A T & S F Ry adj M 4s standard 1995.....	5.18	5.31	5.33	5.33	5.36	5.32	5.44	5.54	5.63	5.48	5.63	5.78	5.69
110	Northern Pac Ry gen lien 3s 2047.....	4.97	5.06	5.11	5.17	5.08	5.08	5.16	5.33	5.32	5.26	5.46	5.53	5.53
111	Atl Coast Line 1st cons M 4s 1952.....	4.95	5.05	5.08	5.20	5.14	5.16	5.25	5.47	5.42	5.28	5.42	5.45	5.45
112	Del & Hudson Co 1st & ref M 4s 1943.....	5.07	5.13	5.16	5.16	5.16	5.12	5.18	5.35	5.53	5.29	5.39	5.61	5.67
113	Central of Georgia cons M 5s 1945.....	5.40	5.58	5.69	5.72	5.53	5.64	5.75	5.86	6.04	5.96	5.91	6.05	6.03
114	Pennsylvania RR cons M 4s 1948.....	4.82	4.75	4.66	4.86	4.87	4.90	4.82	5.00	5.10	4.90	5.04	5.04	5.01
115	Kansas City So Ry 1st M 3s 1950.....	5.54	5.38	5.72	5.77	5.75	5.75	5.76	6.37	6.42	5.91	6.14	6.31	6.10
116	L & N (Atl Knox & Cin Div) 4s 1955.....	5.37	5.49	5.30	5.32	5.35	5.35	5.51	5.72	5.84	5.44	5.78	5.75	5.81
117	Ches Central RR ref M 4s 1943.....	4.90	5.05	5.05	5.10	5.17	5.18	5.27	5.33	5.43	5.20	5.35	5.35	5.68
118	Ches Bay & W Ry gen M 5s 1958.....	5.04	5.04	5.13	5.15	5.08	5.07	5.08	5.39	5.24	5.14	5.27	5.31	5.24
119	Southern Ry 1st cons M 5s 1904.....	5.24	5.28	5.33	5.37	5.33	5.31	5.43	5.54	5.65	5.58	5.79	5.84	5.84
120	Un Pac RR 1st lien & ref M 4s 2008.....	4.91	4.89	4.92	5.01	4.98	4.98	5.11	5.16	5.19	5.08	5.25	5.19	5.17
121	Atl Coast Line (L & N coll) 4s 1952.....	5.40	5.51	5.71	5.73	5.59	5.53	5.68	6.01	5.98	5.75	5.93	6.18	6.10
122	Nor & West (P C & C) Joint 4s 1941.....	5.11	5.12	5.16	5.21	5.23	5.22	5.28	5.28	5.32	5.28	5.32	5.31	5.27
123	Grt Nor Ry 1st & ref M 4 1/2s 1961.....	4.97	5.05	5.04	5.07	5.03	5.01	5.03	5.18	5.17	5.03	5.28	5.35	5.33
124	Canada So 1st & ref M 3s 1962.....	5.26	5.34	5.37	5.61	5.41	5.36	5.35	5.41	5.36	5.41	5.68	5.95	5.83
125	Morris & Essex 1st ref M 3 1/2s 2000.....	4.56	4.64	4.72	4.81	4.79	4.84	4.83	4.93	4.94	4.86	4.90	4.96	4.98
126	Pennsylvania RR cons M 4 1/2s 1960.....	4.74	4.74	4.76	4.85	4.83	4.76	4.76	4.76	4.90	4.95	4.97	5.00	4.99

YIELDS OF RAILROAD BONDS
JAN. 1920—JAN. 1921

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361	5.51	5.54	5.58	5.90	5.98	5.95	5.83	5.63	5.41	5.44	5.56	5.84	5.50
71	Illinois Central RR 1st M 4s 1952	5.89	5.78	5.78	6.14	6.33	6.33	6.57	6.28	6.09	5.87	5.93	6.14	5.93
72	Wabash RR Co 1st M 5s 1939	5.86	5.85	6.06	6.42	6.76	6.58	6.63	6.53	6.17	5.90	6.18	6.46	6.16
78	Cies & Ohio Ry 1st cons 5s 1939	5.51	5.58	5.67	6.10	6.38	6.27	6.08	6.05	5.81	5.90	6.18	5.90	5.70
83	Ill Central (L N O & T) col 4s 1953	6.15	6.37	6.35	6.81	6.96	6.99	6.71	6.44	6.20	5.90	6.21	6.40	6.09
86	E Tenn V & G Ry cons 1st M 5s 1956	5.64	5.94	5.81	5.97	6.14	6.24	6.38	6.30	6.04	5.75	5.72	5.97	5.87
88	Lake Sh. & Mich So 1st M 3 1/2s 1997	5.07	5.17	5.19	5.36	5.43	5.41	5.39	5.20	5.22	5.03	5.11	5.20	5.08
91	Union Pac RR 1st M RR & W 4s 1947	5.14	5.25	5.25	5.38	5.67	5.69	5.47	5.40	5.37	5.28	5.30	5.30	5.25
92	Chicago & N. W. Ry 1st M 4s 1947	5.47	5.49	5.46	5.92	6.05	5.99	5.74	5.43	5.36	5.44	5.58	5.71	5.43
93	Chi Rock Is & Pac Ry gen M 4s 1988	5.47	5.94	5.58	5.92	6.05	5.89	6.03	5.80	5.59	5.44	5.58	5.84	5.63
94	Arch Top & Santa Fe gen M 4s 1995	5.05	5.27	5.23	5.51	5.62	5.57	5.55	5.35	5.29	5.21	5.25	5.40	5.20
95	N Y Cent & Hudson River M 3 1/2s 1997	5.22	5.25	5.39	5.41	5.60	5.57	5.57	5.43	5.23	5.09	5.11	5.30	5.15
98	Louisville & Nash unified 4s 1940	5.45	5.60	5.55	5.84	6.23	6.06	5.98	5.82	5.74	5.44	5.60	5.76	5.48
99	Oregon RR & Nav Co cons M 4s 1946	5.51	5.77	5.84	6.21	6.57	6.28	6.65	6.09	5.78	5.51	5.68	5.85	5.71
100	Chi Bur & Q (Ill Div) M 3 1/2s 1949	5.26	5.48	5.50	5.38	6.10	5.88	5.92	5.77	5.66	5.39	5.48	5.58	5.32
101	Central Pacific 1st ref M 4s 1949	5.73	6.10	5.98	6.41	6.47	6.36	6.33	6.35	5.96	5.84	5.97	6.04	5.91
102	Nor Pac RR 1st ref M 4s 1907	5.73	5.73	5.40	5.64	5.71	5.50	5.52	5.43	5.33	5.36	5.30	5.40	5.23
103	Nor & West Ry 1st cons M 4s 1906	5.17	5.40	5.37	5.66	5.73	5.50	5.52	5.44	5.33	5.36	5.30	5.40	5.23
104	Central RR of N J gen M 3s 1987	4.99	5.05	5.05	5.16	5.36	5.36	5.40	5.32	5.15	5.09	5.03	5.19	5.16
105	Hocking Valley 1st cons M 4 1/2s 1999	6.37	6.50	6.46	6.90	7.25	7.26	7.04	6.63	6.31	5.97	5.99	6.38	6.23
106	N & W Ry Div 1st & gen M 4s 1944	5.78	5.87	5.87	5.91	6.29	6.28	6.47	6.11	6.15	5.81	5.88	6.02	5.89
107	Ore Sh Line RR cons 1st M 5s 1946	5.53	5.57	5.60	5.88	6.42	6.40	6.21	6.11	5.94	5.79	5.86	5.87	5.78
108	Southern Pac 1st ref M sf 4s 1955	5.42	5.59	5.67	5.89	6.13	6.10	5.94	5.74	5.64	5.52	5.65	5.78	5.52
109	A T & S Fe Ry adj M 4s stamped 1995	5.69	5.81	5.87	6.01	6.28	6.19	6.16	6.02	5.72	5.50	5.67	5.80	5.63
110	Northern Pac Ry gen 3s 2047	5.53	5.71	5.65	5.84	5.86	5.79	5.86	5.66	5.44	5.23	5.43	5.58	5.47
111	Atl Coast Line 1st cons M 4s 1952	5.45	5.68	5.67	5.79	5.95	5.97	6.05	5.84	5.67	5.47	5.48	5.65	5.40
112	Del & Hudson Co 1st & ref M 4s 1943	5.67	5.75	5.67	5.81	6.38	6.33	6.50	5.94	5.62	5.51	5.67	5.68	5.40
113	Central of Georgia cons M 5s 1945	6.03	6.19	6.39	6.70	7.05	6.94	6.74	6.43	6.41	6.14	6.05	6.30	6.06
114	Pennsylvania RR cons M 4s 1948	5.01	5.21	5.26	5.21	5.48	5.29	5.47	5.37	5.38	5.23	5.25	5.29	5.16
115	Kansas City So Ry 1st M 3s 1950	6.10	6.26	6.38	6.67	6.80	6.75	6.70	6.64	6.44	6.41	6.60	6.62	6.41
116	L & N (Atl Knox & Cin Div) 4s 1955	5.81	6.23	6.16	6.27	6.52	6.67	6.81	6.37	5.90	5.68	5.87	6.06	5.90
117	Illinois Central RR ref M 4s 1955	5.68	6.04	5.87	6.12	6.44	6.18	6.07	5.98	5.69	5.46	5.62	5.76	5.54
118	Chic Burl & Quincy gen M 4s 1958	5.24	5.40	5.45	5.60	6.05	5.87	5.68	5.46	5.31	5.15	5.27	5.59	5.26
119	Southern Ry 1st cons M 3s 1994	5.84	5.97	5.93	6.18	6.34	6.29	6.30	6.09	5.92	5.63	5.71	6.05	5.73
120	Un Pac RR 1st den & ref M 4s 2008	5.17	5.47	5.57	5.80	5.79	5.74	5.74	5.44	5.31	5.23	5.36	5.40	5.12
121	Atl Coast Line (L & N coll) 4s 1952	6.10	6.29	6.35	6.75	7.02	6.96	7.01	6.73	6.20	6.03	5.94	6.30	6.10
122	Nor & West (P & C) joint 4s 1941	5.67	5.84	5.85	6.09	6.34	6.27	6.31	5.94	5.63	5.41	5.67	5.81	5.61
123	Grt Nor Ry 1st & ref M 4 1/2s 1961	5.14	5.26	5.27	5.66	6.10	5.82	5.78	5.55	5.33	5.25	5.31	5.43	5.28
124	Canada So 1st & ref cons 5s 1962	5.83	6.16	6.22	6.11	6.54	6.50	6.36	5.96	5.63	5.41	5.60	5.76	5.88
125	Morris & Essex 1st ref M 3 1/2s 2000	4.98	5.02	5.11	5.32	5.35	5.57	5.32	5.20	5.11	4.97	5.03	5.23	5.07
126	Pennsylvania RR cons M 4 1/2s 1960	4.99	5.03	5.04	5.26	5.48	5.45	5.31	5.18	5.13	5.12	5.11	5.16	5.06

RAILROAD BOND YIELDS

A93

YIELDS OF RAILROAD BONDS
JAN 1921—JAN. 1922

Ref No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 1921	5.59	5.46	5.63	5.71	5.63	5.76	5.63	5.51	5.47	5.47	5.08	5.03	4.97
71	Illinois Central RR 1st M 4s 1922	5.93	5.40	6.09	6.05	6.08	6.32	6.14	5.84	5.78	5.73	5.48	5.31	5.17
72	Wabash RR Co 1st M 5s 1939	6.16	6.04	6.24	6.35	6.32	6.54	6.41	6.23	6.10	6.10	5.71	5.66	5.40
78	Cleveland RR 1st M 4s 1937	5.70	5.70	5.72	5.68	5.69	5.94	5.84	5.63	5.66	5.64	5.50	5.30	5.04
82	Cleveland RR 1st M 4s 1939	6.09	6.10	6.18	6.16	6.19	6.40	6.40	5.95	5.86	5.85	5.52	5.44	5.37
83	Ill. Central (L N O & T) col 4s 1953	5.87	5.76	5.81	5.76	5.79	5.91	5.91	5.92	5.73	5.73	5.59	5.45	5.43
86	E Tenn V & G Ry cons 1st M 5s 1956	5.08	5.20	5.18	5.16	5.19	5.31	5.35	5.25	5.13	5.05	4.98	4.67	4.51
88	Lake Sh & Mich So 1st M 3½s 1997	5.08	5.20	5.18	5.16	5.19	5.31	5.35	5.25	5.13	5.05	4.98	4.67	4.51
91	Union Pac RR 1st M RR & G 4s 1947	5.23	5.31	5.37	5.37	5.30	5.60	5.38	5.32	5.23	5.23	5.13	4.75	4.61
92	Chicago & North Western RR 1st M 4s 1947	5.23	5.31	5.37	5.37	5.30	5.60	5.38	5.32	5.23	5.23	5.13	4.75	4.61
93	Chi Rock Is & Pac Ry gen M 4s 1988	5.63	5.71	5.90	5.78	5.75	5.86	5.71	5.64	5.49	5.44	5.14	4.91	4.97
94	Arch Top & Santa Fe gen M 4s 1995	5.20	5.17	5.21	5.25	5.27	5.41	5.22	5.19	5.14	5.13	4.85	4.70	4.60
95	N Y Cent & Hudson River M 3½s 1997	5.15	5.23	5.21	5.21	5.33	5.51	5.36	5.31	5.26	5.18	4.96	4.73	4.64
98	Louisville & Nash unified 4s 1940	5.48	5.53	5.55	5.62	5.64	5.80	5.64	5.47	5.45	5.40	5.19	4.98	4.89
99	Oregon RR & Nav Co cons M 4s 1946	5.71	5.66	5.65	5.64	5.65	5.78	5.82	5.67	5.52	5.44	5.32	5.17	5.06
100	Chi Bur & Q (Ill Div) M 3½s 1949	5.32	5.49	5.43	5.47	5.54	5.70	5.53	5.36	5.23	5.24	5.08	4.98	4.87
101	Central Pacific 1st ref M 4s 1949	5.91	6.03	6.07	6.07	6.00	5.99	6.17	6.04	5.94	5.78	5.40	5.25	5.13
102	Pac Ry 1st ref M 4s 1949	5.23	5.30	5.36	5.36	5.35	5.40	5.48	5.27	5.26	5.24	4.97	4.81	4.72
103	Nor & West Ry 1st cons M 4s 1996	5.15	5.22	5.27	5.28	5.30	5.39	5.23	5.19	5.09	5.14	4.80	4.68	4.62
104	Central RR of N J gen M 5s 1987	5.16	5.09	5.19	5.22	5.30	5.35	5.27	5.23	5.15	5.17	4.99	4.84	4.75
105	Hocking Valley 1st cons M 4½s 1999	6.23	6.07	6.12	6.24	6.30	6.39	6.38	6.16	6.12	6.07	5.80	5.50	5.46
106	N & W Ry Div 1st 1 & gen M 4s 1944	5.89	5.92	5.90	5.90	5.99	6.01	5.97	5.79	5.76	5.77	5.66	5.36	5.15
107	Ore Sh Line RR cons 1st M 5s 1946	5.78	5.71	5.67	5.74	5.84	5.98	5.90	5.78	5.70	5.70	5.58	5.09	5.13
108	Southern Pac 1st ref M 4s 1953	5.23	5.31	5.37	5.37	5.30	5.60	5.38	5.32	5.23	5.23	5.13	4.75	4.61
109	Ill & S Fe Ry ad M 4s gen 4d 1995	5.23	5.31	5.37	5.37	5.30	5.60	5.38	5.32	5.23	5.23	5.13	4.75	4.61
110	Northern Pac Ry gen 38 2047	5.47	5.51	5.57	5.52	5.46	5.61	5.45	5.35	5.23	5.21	5.04	4.94	4.94
111	Atl Coast Line 1st cons M 4s 1952	5.40	5.48	5.55	5.64	5.66	5.78	5.54	5.49	5.34	5.40	5.16	4.99	4.81
112	Del & Hudson Co 1st & ref M 4s 1943	5.67	5.65	5.69	5.70	5.86	6.03	5.76	5.66	5.55	5.47	5.18	5.06	4.90
113	Central of Georgia cons M 5s 1945	6.06	6.17	6.17	6.32	6.28	6.34	6.43	6.30	6.08	6.10	5.90	5.82	5.65
114	Pennsylvania RR cons M 4s 1948	5.16	5.16	5.41	5.52	5.53	5.54	5.55	5.32	5.37	5.23	5.11	4.92	4.84
115	Kansas City So Ry 1st M 3s 1950	6.41	6.47	6.35	6.47	6.35	6.43	6.28	6.27	6.12	6.07	5.70	5.49	5.54
116	L & N (Atl Knox & Cin Dir) 4s 1955	5.90	6.05	6.00	6.24	5.94	6.07	5.93	5.85	5.84	5.65	5.56	5.24	5.18
117	Illinois Central RR ref M 4s 1955	5.54	5.61	5.65	5.71	5.71	5.84	5.63	5.50	5.42	5.45	5.24	5.07	4.96
118	Chic Buri & Quincy gen M 4s 1938	5.26	5.17	5.29	5.37	5.49	5.58	5.34	5.31	5.26	5.30	4.98	4.86	4.70
119	Southern Ry 1st cons M 5s 1994	5.73	5.82	5.96	6.04	6.02	6.18	6.00	5.93	5.87	5.85	5.69	5.65	5.63
120	Un Pac RR 1st lien & ref M 4s 2008	5.12	5.18	5.30	5.37	5.33	5.43	5.29	5.17	5.13	5.14	4.94	4.82	4.76
121	Atl Coast Line (L & N coll) 4s 1952	6.10	6.09	6.36	6.36	6.31	6.45	6.21	6.02	5.91	5.90	5.67	5.54	5.52
122	Nor & West (P C & C) Joint 4s 1941	5.81	5.83	5.99	5.99	6.10	6.42	6.14	6.07	5.74	5.69	5.52	5.38	5.30
123	Grt Nor Ry 1st & ref M 4s 1961	5.68	5.68	5.90	5.90	5.94	6.14	5.94	5.87	5.58	5.58	5.43	5.24	5.19
124	Canada So 1st & ref cons 5s 1968	5.07	5.07	5.16	5.16	5.18	5.22	5.24	5.26	5.11	5.13	4.75	4.57	4.48
125	Morris & Essex 1st ref M 3½s 2000	5.07	5.07	5.16	5.16	5.18	5.22	5.24	5.26	5.11	5.13	4.75	4.57	4.48
126	Pennsylvania RR cons M 4½s 1960	5.06	5.16	5.27	5.35	5.37	5.47	5.38	5.27	5.30	5.29	4.97	4.83	4.83

YIELDS OF RAILROAD BONDS
JAN. 1922—JAN. 1923

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361.....	4.97	5.04	4.99	4.94	4.81	4.82	4.79	4.74	4.71	4.80	4.82	4.87	4.83
76	Illinois Central RR col 4s 1952.....	5.12	5.23	5.17	5.14	5.05	5.03	5.04	4.90	4.87	4.96	5.00	4.94	5.01
78	Wabash RR Co 1st M 5s 1939.....	5.40	5.20	5.35	5.24	5.22	5.25	5.08	5.03	4.95	5.11	5.26	5.24	5.15
82	Ches & Ohio Ry 1st cons 5s 1939.....	5.04	5.31	5.11	5.00	4.91	4.88	4.80	4.73	4.76	4.91	4.93	4.91	4.90
83	Ill Central (L N O & T) col 4s 1953.....	5.37	5.44	5.33	5.15	5.20	5.20	5.28	5.14	5.05	5.07	5.14	5.26	5.21
86	E Tenn V & C Ry cons 1st M 5s 1956.....	5.43	5.33	5.24	5.18	5.15	5.12	5.11	5.05	5.03	5.07	5.12	5.16	5.09
88	Lea Sh & Mtn RR 3 1/2s 1909.....	4.55	4.50	4.57	4.53	4.45	4.43	4.45	4.36	4.32	4.42	4.52	4.65	4.56
91	Union Pac RR 1st RR & lg 4s 1947.....	4.75	4.59	4.62	4.57	4.58	4.47	4.31	4.33	4.36	4.43	4.54	4.71	4.74
92	Chicago & Nor West gen M 3 1/2s 1987.....	4.65	4.76	4.77	4.73	4.72	4.70	4.65	4.51	4.54	4.61	4.64	4.73	4.74
93	Chi Rock Is & Pac Ry gen M 4s 1988.....	4.97	4.92	4.89	4.89	4.86	4.92	4.82	4.78	4.75	4.86	4.91	4.92	5.03
94	Atch Top & Santa Fe gen M 4s 1995.....	4.60	4.57	4.58	4.54	4.53	4.46	4.33	4.32	4.35	4.50	4.53	4.49	4.52
95	N Y Cent & Hudson Ktver M 3 1/2s 1997.....	4.64	4.66	4.64	4.58	4.57	4.59	4.47	4.37	4.42	4.55	4.57	4.59	4.62
96	Ouising RR & N Y Co 5s 1940.....	5.69	5.71	5.69	5.61	5.61	5.61	5.46	5.38	5.47	5.57	5.64	5.70	5.81
99	Omaha RR & N Y Co 5s 1946.....	5.69	5.71	5.69	5.61	5.61	5.61	5.46	5.38	5.47	5.57	5.64	5.70	5.81
100	Chi Bur & Q (Ill Div) M 3 1/2s 1949.....	4.87	4.87	4.86	4.82	4.67	4.67	4.59	4.74	4.61	4.84	4.91	4.90	4.83
101	Central Pacific 1st ref M 4s 1949.....	5.13	5.17	5.11	4.94	4.85	4.82	4.64	4.65	4.65	4.80	4.99	4.90	4.91
102	Nor Pac Ry prior lien lg M 4s 1997.....	4.72	4.79	4.76	4.68	4.62	4.65	4.54	4.52	4.47	4.61	4.71	4.70	4.72
103	Nor & West Ry 1st cons M 4s 1996.....	4.62	4.63	4.69	4.60	4.58	4.49	4.32	4.33	4.32	4.46	4.56	4.48	4.38
104	Central RR of N J gen M 5s 1987.....	4.75	4.71	4.69	4.63	4.61	4.63	4.58	4.52	4.54	4.55	4.59	4.66	4.63
105	Hocking Valley 1st cons M 4 1/2s 1999.....	5.46	5.42	5.36	5.26	5.26	5.26	5.28	5.11	5.07	5.21	5.33	5.30	5.30
106	N & W Ry Div 1st l & gen M 4s 1944.....	5.15	5.19	5.12	5.07	5.06	4.94	4.82	4.80	4.70	4.84	5.01	4.97	5.06
107	Ore Sh Line RR cons lg M 5s 1946.....	5.13	5.16	4.97	4.96	4.88	4.82	4.68	4.64	4.51	4.76	4.82	4.84	4.72
108	Southern Pac 1st ref M sf 4s 1955.....	4.92	4.96	4.89	4.71	4.80	4.73	4.62	4.51	4.55	4.73	4.82	4.81	4.79
109	A T & S Fe Ry adi M 4s stamped 1995.....	5.04	4.99	4.96	4.86	4.87	4.80	4.82	4.73	4.75	4.89	4.95	4.98	4.92
110	Northern Pac Ry gen lien 3s 2047.....	4.94	5.00	4.92	4.82	4.82	4.82	4.82	4.74	4.70	4.85	4.95	4.92	4.92
111	Atl Coast Line 1st cons M 4s 1952.....	4.81	4.78	4.77	4.70	4.75	4.68	4.57	4.54	4.51	4.67	4.83	4.78	4.78
112	Del & Hudson Co 1st & ref M 4s 1943.....	4.90	4.93	5.06	4.78	4.74	4.74	4.61	4.61	4.60	4.82	4.91	4.91	4.93
113	Central of Georgia cons M 5s 1945.....	5.63	5.58	5.33	5.26	5.12	5.12	5.07	4.96	5.13	5.23	5.23	5.22	5.25
114	Central of Georgia cons M 5s 1945.....	5.63	5.58	5.33	5.26	5.12	5.12	5.07	4.96	5.13	5.23	5.23	5.22	5.25
115	Kansas City So Ry 1st M 5s 1950.....	5.54	5.51	5.43	5.38	5.17	5.08	4.93	4.92	4.94	5.08	5.10	5.15	5.20
116	L & N (Atl Knox & Cin Div) 4s 1955.....	5.18	5.14	4.98	4.90	4.86	4.80	4.79	4.77	4.82	4.93	4.93	4.80	4.90
117	Illinois Central RR ref M 4s 1955.....	4.96	4.93	4.89	4.75	4.78	4.78	4.66	4.56	4.58	4.75	4.86	4.80	4.82
118	Chic Burl & Quincy gen M 4s 1958.....	4.70	4.74	4.76	4.65	4.66	4.61	4.47	4.51	4.50	4.57	4.76	4.67	4.68
119	Southern Ry 1st cons M 5s 1994.....	5.63	5.55	5.41	5.26	5.23	5.28	5.18	5.07	5.06	5.10	5.21	5.17	5.15
120	Un Pac RR 1st lien & ref M 4s 2008.....	4.76	4.75	4.67	4.58	4.67	4.65	4.53	4.49	4.50	4.65	4.71	4.68	4.57
121	Atl Coast Line (L & N coll) 4s 1952.....	5.52	5.48	5.32	5.22	5.19	5.24	5.10	5.00	5.07	5.18	5.30	5.22	5.20
122	N Y & West P & O Joint 4s 1941.....	5.30	5.27	5.25	5.15	5.07	5.04	5.04	5.02	4.90	4.99	5.10	5.09	5.01
123	Get N R 1st & 2nd cons M 4s 1961.....	5.33	5.29	5.20	5.13	5.11	5.11	4.69	4.72	4.90	4.70	4.82	4.74	4.81
124	Canada So 1st & ref cons 5s 1962.....	5.33	5.29	5.20	5.13	5.11	5.11	4.69	4.72	4.90	4.70	4.82	4.74	4.81
125	Morris & Essex 1st ref M 3 1/2s 2000.....	4.48	4.52	4.55	4.50	4.36	4.44	4.36	4.35	4.35	4.43	4.62	4.58	4.52
126	Pennsylvania RR cons M 4 1/2s 1960.....	4.83	4.76	4.77	4.74	4.67	4.65	4.54	4.54	4.48	4.47	4.59	4.66	4.63

RAILROAD BOND YIELDS

A95

YIELDS OF RAILROAD BONDS
JAN. 1923—JAN. 1924

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
76	West Shore RR 1st M 4s 2361	4.83	4.92	5.06	5.08	4.98	5.03	5.04	5.02	5.02	5.07	5.06	5.08	5.01
77	Illinois Central RR coll 4s 1952	5.01	5.02	5.13	5.24	5.06	5.18	5.12	5.12	5.10	5.20	5.03	4.98	4.99
78	Wabash RR Co 1st M 5s 1939	5.15	5.15	5.25	5.41	5.38	5.43	5.47	5.47	5.47	5.40	5.35	5.33	5.24
82	Che & Ohio Ry 1st cons 5s 1939	4.90	4.85	5.06	5.10	5.00	4.99	4.99	4.97	4.97	5.04	5.00	4.98	4.99
83	Ill Central (L N O & T) col 4s 1953	5.21	5.28	5.40	5.43	5.34	5.36	5.33	5.32	5.32	5.37	5.37	5.37	5.30
86	E Tenn V & G Ry cons 1st M 5s 1956	5.09	5.13	5.21	5.14	5.15	5.15	5.12	5.11	5.14	5.09	5.09	5.08	5.09
88	Lake Sh & Mich So 1st M 3½s 1997	4.56	4.68	4.81	4.69	4.62	4.64	4.67	4.68	4.73	4.64	4.67	4.65	4.56
93	Union Pac RR 1st M RR & Ig 4s 1947	4.54	4.44	4.66	4.73	4.63	4.62	4.58	4.58	4.98	4.85	4.85	4.85	4.58
92	Chicago & N W gen M 3½s 1987	4.74	4.83	5.00	5.17	4.86	4.86	4.86	4.86	4.98	4.98	5.03	5.10	5.09
93	Chi Rock Is & Pac Ry gen M 4s 1988	5.03	5.14	5.14	5.16	5.13	5.13	5.12	5.14	5.21	5.24	5.19	5.16	5.09
94	Atch Top & Santa Fe gen M 4s 1995	4.52	4.54	4.67	4.68	4.58	4.59	4.56	4.47	4.57	4.55	4.58	4.62	4.58
95	N Y Cent & Hudson River M 3½s 1997	4.62	4.75	4.85	4.82	4.74	4.78	4.79	4.78	4.83	4.79	4.75	4.79	4.69
98	Louisville & Nash unificd 4s 1940	4.81	4.78	5.00	4.92	4.78	4.90	4.84	5.00	4.99	4.92	4.90	4.86	4.84
99	Oregon RR & Nav Co cons M 4s 1946	4.93	4.90	5.01	5.08	4.95	4.95	4.97	5.00	5.01	4.98	4.97	4.98	4.98
100	Chi Bur & Q (Ill Div) M 3½s 1949	4.75	4.79	4.89	4.86	4.78	4.86	4.86	4.84	4.90	4.86	4.89	4.91	4.87
101	Central Pacific 1st ref M 4s 1949	4.91	4.94	4.91	5.27	5.01	5.05	4.98	4.88	4.88	4.97	4.98	4.95	4.94
102	N Pac Ry Portland 1st ref M 4s 1997	4.38	4.41	4.59	4.68	4.58	4.58	4.56	4.44	4.44	4.93	4.97	4.98	4.93
103	Norfolk & West RR 1st M 1996	4.38	4.41	4.59	4.68	4.58	4.58	4.56	4.44	4.44	4.82	4.84	4.88	4.58
104	Central RR of N J gen M 5s 1987	4.63	4.74	4.74	4.79	4.74	4.72	4.77	4.72	4.71	4.82	4.84	4.81	4.75
105	Hocking Valley 1st cons M 4½s 1999	5.30	5.35	5.51	5.50	5.47	5.42	5.51	5.39	5.45	5.44	5.39	5.37	5.29
106	N & W Ry Div 1st & gen M 4s 1944	5.06	5.05	5.25	5.23	5.09	5.08	5.07	4.93	4.93	5.01	4.97	4.94	4.98
107	Ore Sh Line RR cons 1st M 5s 1946	4.73	4.86	4.98	4.95	4.91	4.83	4.89	4.88	4.93	4.95	4.90	4.88	4.82
108	Southern Pac 1st ref M 4s 1955	4.76	4.84	4.98	4.98	4.82	4.88	4.82	4.82	4.87	4.90	4.78	4.85	4.82
109	A T & S Fe Ry adf M 4s stamped 1995	4.92	4.98	5.10	5.15	5.02	5.03	5.03	5.04	5.05	5.04	5.01	5.02	5.17
110	Northern Pac Ry gen 3s 2047	4.92	4.93	4.93	5.07	5.01	5.04	5.07	5.03	5.08	5.14	5.14	5.23	5.17
111	Atl Coast Line 1st cons M 4s 1952	4.78	4.80	4.98	5.01	4.90	4.90	4.90	4.85	4.93	4.92	4.85	4.85	4.81
112	Del & Hudson Co 1st & ref M 4s 1943	4.93	4.95	5.16	5.21	5.08	5.08	5.23	5.18	5.27	5.33	5.34	5.38	5.18
113	Central of Georgia cons M 5s 1945	5.25	5.21	5.42	5.40	5.32	5.36	5.35	5.35	5.39	5.39	5.37	5.42	5.18
114	Pennsylvania RR cons M 4s 1948	4.70	4.65	4.77	4.76	4.75	4.81	4.81	4.75	4.84	4.83	4.85	4.84	4.84
115	Kansas City So Ry 1st M 3s 1950	5.20	5.24	5.33	5.42	5.36	5.43	5.49	5.22	5.09	5.10	5.00	5.17	5.19
116	L & N (Atl Knox & Cin Div) 4s 1955	4.90	4.88	5.16	5.13	5.05	5.02	5.20	5.07	5.16	5.09	5.10	4.99	4.94
117	Illinois Central RR ref M 4s 1955	4.82	4.83	5.03	5.00	4.93	4.87	4.88	4.86	4.98	4.94	4.85	4.87	4.87
118	Chi Bur & Quincy gen M 4s 1958	4.98	5.03	5.25	5.20	5.06	5.06	5.06	5.06	5.06	5.06	5.06	5.06	4.98
119	Southern Ry 1st cons M 4s 1960	5.06	5.21	5.35	5.30	5.20	5.24	5.24	5.24	5.31	5.24	5.24	5.23	5.18
120	Un Pac RR 1st gen & ref M 4s 2008	4.57	4.74	4.90	4.88	4.79	4.82	4.81	4.78	4.90	4.94	4.84	4.87	4.85
121	Atl Coast Line (L & N coll) 4s 1952	5.01	5.25	5.39	5.40	5.37	5.41	5.29	5.29	5.27	5.27	5.23	5.21	5.15
122	Norfolk & West (P C & C) Joint 4s 1941	5.01	5.10	5.24	5.20	5.18	5.22	5.22	5.23	5.22	5.23	5.18	5.15	5.07
123	Grt Nor Ry 1st & ref M 4½s 1961	4.74	4.78	4.87	4.83	4.82	4.83	4.87	4.87	5.01	5.06	5.08	5.06	5.02
124	Canada So 1st & ref cons 5s 1962	5.03	5.06	5.20	5.23	5.19	5.18	5.13	5.08	5.17	5.14	5.09	5.10	5.01
125	Morris & Essex 1st ref M 3½s 2000	4.52	4.54	4.60	4.66	4.59	4.61	4.67	4.71	4.73	4.75	4.63	4.67	4.63
126	Pennsylvania RR cons M 4½s 1960	4.63	4.66	4.78	4.84	4.76	4.75	4.78	4.78	4.68	4.84	4.81	4.81	4.79

YIELDS OF RAILROAD BONDS
JAN. 1924—JAN. 1925

Ref. No.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70 West Shore RR 1st M 4s 2361.....	5.01	4.87	4.97	4.96	4.96	4.87	4.81	4.78	4.84	4.85	4.83	4.85	4.86
71 Illinois Central RR coll 4s 1952.....	4.99	5.05	5.06	5.12	5.07	4.97	4.88	4.84	4.91	4.89	4.87	4.88	4.87
72 Illinois Central RR 1st M 3s 1939.....	4.99	4.99	5.00	5.12	5.07	4.97	4.88	4.84	4.91	4.89	4.87	4.88	4.87
73 Chicago & Ohio Ry 1st M 4s 1939.....	4.99	4.99	5.00	5.12	5.07	4.97	4.88	4.84	4.91	4.89	4.87	4.88	4.87
83 Ill Central (L N O & T) coll 4s 1953.....	5.30	5.31	5.28	5.22	5.08	5.01	4.99	5.05	5.06	5.05	5.04	5.10	5.08
86 E Tenn V & G Ry cons 1st M 5s 1956.....	5.09	5.09	5.11	5.07	5.02	5.03	4.99	4.98	4.99	4.96	4.93	4.98	4.96
88 Lake Sh & Mich So 1st M 3 1/2s 1907.....	4.56	4.60	4.58	4.52	4.52	4.45	4.47	4.59	4.48	4.47	4.48	4.52	4.50
89 Union Pac RR 1st M 4s 1917.....	5.02	5.01	5.03	5.01	4.98	4.93	4.90	4.83	4.81	4.79	4.79	4.80	4.80
92 Chi Rock Is & Pac Ry gen M 4s 1938.....	5.09	5.06	5.05	5.03	4.98	4.95	4.87	4.87	4.86	4.87	4.86	4.84	4.84
94 Atch Top & Santa Fe gen M 4s 1938.....	4.58	4.63	4.82	4.60	4.57	4.52	4.45	4.40	4.50	4.49	4.48	4.53	4.52
95 N Y Cent & Hudson River M 3 1/2s 1997.....	4.69	4.73	4.72	4.68	4.60	4.56	4.51	4.65	4.61	4.51	4.61	4.60	4.63
96 Louisville & Nash United 4s 1940.....	4.96	4.95	4.95	4.98	4.98	4.90	4.84	4.86	4.83	4.82	4.81	4.83	4.69
99 RR & Q (Ill Div) M 3 1/2s 1946.....	4.87	4.87	4.90	4.85	4.80	4.73	4.73	4.74	4.71	4.71	4.75	4.76	4.73
100 Chi Bur & Q (Ill Div) M 3 1/2s 1949.....	4.87	4.87	4.90	4.85	4.80	4.73	4.73	4.74	4.71	4.71	4.75	4.76	4.73
101 Central Pacific 1st ref M 4s 1949.....	4.94	4.98	4.97	4.96	4.96	4.86	4.79	4.89	4.87	4.89	4.85	4.85	4.86
102 Nor Pac Ry prior lien lg M 4s 1996.....	4.93	4.95	5.00	4.98	4.91	4.83	4.73	4.76	4.73	4.72	4.76	4.80	4.78
103 Nor Pac Ry 1st cons M 4s 1996.....	4.93	4.95	5.00	4.98	4.91	4.83	4.73	4.76	4.73	4.72	4.76	4.80	4.78
104 A T & S Ry 1st cons M 4s 1955.....	4.82	4.88	4.87	4.83	4.78	4.69	4.61	4.70	4.67	4.62	4.66	4.75	4.70
105 Hocking Valley 1st cons M 4 1/2s 1999.....	5.29	5.32	5.32	5.25	5.16	5.11	5.08	5.08	5.08	5.10	5.09	5.04	5.01
106 N & W Ry Div 1st & gen M 4s 1944.....	4.98	5.02	5.03	4.99	4.99	4.88	4.82	4.78	4.86	4.78	4.85	4.85	4.96
107 Ore Sh Line RR cons 1st M 5s 1946.....	4.82	4.83	4.87	4.83	4.80	4.72	4.63	4.67	4.70	4.63	4.59	4.68	4.67
108 Southern Pac 1st ref M 4s 1955.....	4.82	4.88	4.87	4.83	4.78	4.69	4.61	4.70	4.67	4.62	4.66	4.75	4.70
109 A T & S Ry adj M 4s stamped 1938.....	5.02	5.00	5.01	4.96	5.02	5.02	4.91	4.98	4.86	4.83	4.80	4.80	4.84
110 Northern Pac Ry gen lien 3s 2047.....	5.17	5.20	5.28	5.27	5.20	5.02	4.91	4.98	4.93	4.93	4.97	4.80	4.96
111 Atl Coast Line 1st cons M 4s 1952.....	4.81	4.84	4.84	4.79	4.69	4.62	4.52	4.59	4.60	4.55	4.61	4.66	4.66
112 Del & Hudson Co 1st & ref M 4s 1943.....	5.18	5.17	5.12	5.10	5.03	4.90	4.84	4.96	4.92	4.90	4.87	4.82	4.90
113 Central of Georgia cons M 5s 1945.....	5.32	5.33	5.33	5.24	5.14	4.99	5.00	5.02	5.05	4.97	4.95	5.04	5.01
114 Pennsylvania RR cons M 4s 1948.....	4.83	4.83	4.82	4.77	4.74	4.59	4.58	4.52	4.57	4.53	4.52	4.63	4.62
115 Kansas City So Ry 1st M 3s 1950.....	5.19	5.23	5.23	5.14	5.05	5.04	5.02	5.08	5.08	5.04	5.01	5.08	5.07
116 L & N (Atl Knox & Cin Div) 4s 1955.....	4.94	4.94	5.01	4.88	4.89	4.75	4.63	4.72	4.69	4.67	4.65	4.66	4.70
117 Illinois Central RR ref M 4s 1955.....	4.77	4.91	4.90	4.88	4.78	4.68	4.61	4.68	4.66	4.60	4.65	4.73	4.70
118 Chic Burl & Quincy gen M 4s 1958.....	4.83	4.83	4.85	4.82	4.76	4.63	4.60	4.67	4.63	4.62	4.66	4.69	4.66
119 Southern Ry 1st cons M 5s 1994.....	5.19	5.17	5.15	5.10	5.03	5.00	4.95	4.96	4.97	4.97	4.92	4.95	4.97
120 Un Pac Ry 1st lien & ref M 4s 2008.....	4.85	4.80	4.84	4.83	4.77	4.64	4.60	4.69	4.64	4.63	4.68	4.73	4.72
121 Atl Coast Line (L & N coll) 4s 1952.....	5.15	5.18	5.17	5.12	5.07	4.93	4.90	4.97	4.93	4.92	4.88	4.89	4.88
122 Norf & West (P C & C) joint 4s 1941.....	5.02	5.06	5.04	4.98	4.93	4.84	4.80	4.84	4.80	4.80	4.70	4.70	4.69
123 Gt Nor Ry 1st & ref M 3 1/2s 1961.....	5.02	4.98	5.05	4.93	4.92	4.86	4.70	4.79	4.78	4.74	4.73	4.70	4.71
124 Canada So 1st & ref cons 5s 1962.....	5.11	5.07	5.04	4.95	5.02	4.95	4.95	4.92	4.93	4.91	4.91	4.91	4.95
125 Morris & Essex 1st ref M 3 1/2s 2000.....	4.63	4.62	4.59	4.60	4.59	4.54	4.44	4.50	4.51	4.49	4.55	4.54	4.57
126 Pennsylvania RR cons M 4 1/2s 1960.....	4.79	4.80	4.77	4.73	4.69	4.58	4.54	4.56	4.59	4.57	4.54	4.58	4.55

RAILROAD BOND YIELDS

A97

YIELDS OF RAILROAD BONDS
JAN. 1925—JAN. 1926

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361.	4.86	4.86	4.87	4.83	4.76	4.76	4.81	4.83	4.84	4.84	4.81	4.72	4.74
76	Illinois Central RR col'd 4s 1952.	4.87	4.87	4.85	4.82	4.79	4.78	4.85	4.83	4.84	4.84	4.84	4.82	4.76
83	Ill Central (L N O & T) col'd 4s 1953.	5.08	5.04	5.04	5.01	4.98	4.99	5.01	5.09	5.03	5.05	5.02	5.00	4.97
88	Lake Sh & Mich So 1st M 3 1/2s 1997.	4.50	4.50	4.50	4.47	4.41	4.43	4.58	4.45	4.46	4.59	4.52	4.50	4.47
91	Union Pac RR 1st M RR & IG 4s 1947.	4.60	4.56	4.51	4.46	4.41	4.43	4.58	4.61	4.57	4.59	4.61	4.58	4.50
92	Chicago & Nor West gen M 3 1/2s 1987.	4.83	4.79	4.78	4.83	4.74	4.76	4.78	4.83	4.78	4.81	4.82	4.77	4.71
93	Chi Rock Is & Pac Ry gen M 4s 1988.	4.84	4.83	4.82	4.84	4.75	4.78	4.82	4.87	4.83	4.81	4.79	4.76	4.70
94	Arch Top & Santa Fe gen M 4s 1995.	4.52	4.51	4.50	4.46	4.38	4.41	4.47	4.51	4.51	4.53	4.50	4.49	4.44
95	N Y Cent & Hudson River M 3 1/2s 1997.	4.63	4.63	4.58	4.54	4.48	4.51	4.58	4.54	4.54	4.53	4.50	4.46	4.46
99	Oregon RR & Nav Co cons M 4s 1946.	4.56	4.55	4.54	4.53	4.78	4.72	4.78	4.82	4.81	4.82	4.76	4.74	4.69
100	Chi Bur & Q (Ill Div) M 3 1/2s 1949.	4.73	4.75	4.58	4.56	4.47	4.50	4.53	4.65	4.65	4.70	4.71	4.66	4.60
101	Central Pacific 1st ref M 4s 1949.	4.86	4.90	4.83	4.80	4.74	4.77	4.84	4.90	4.86	4.88	4.81	4.76	4.71
102	Nor Pac Ry prior lien M 4s 1997.	4.78	4.75	4.77	4.80	4.75	4.70	4.75	4.82	4.80	4.80	4.77	4.69	4.65
103	Nor & West Ry 1st cons M 4s 1996.	4.52	4.52	4.45	4.45	4.37	4.44	4.51	4.47	4.53	4.53	4.52	4.50	4.46
104	Central RR of N J gen M 4s 1987.	4.62	4.63	4.60	4.59	4.57	4.56	4.62	4.58	4.56	4.56	4.53	4.58	4.53
105	Hocking Valley 1st cons M 4 1/2s 1999.	5.01	5.00	5.00	4.99	4.96	4.93	4.95	5.04	5.02	5.00	4.97	4.93	4.90
106	N & W Ry Div 1st. 1 & gen M 4s 1944.	4.86	4.88	4.90	4.78	4.72	4.74	4.81	4.81	4.76	4.77	4.75	4.72	4.74
107	Ore Sh Line RR cons 1st M 5s 1946.	4.67	4.66	4.63	4.60	4.52	4.57	4.69	4.68	4.75	4.77	4.69	4.67	4.60
108	Southern Pac 1st ref M sf 4s 1955.	4.70	4.66	4.60	4.56	4.52	4.57	4.68	4.75	4.73	4.80	4.72	4.71	4.71
109	A T & S Fe Ry adj M 4s stamped 1995.	4.84	4.84	4.81	4.81	4.76	4.76	4.82	4.85	4.79	4.80	4.72	4.71	4.71
110	Northern Pac Ry gen lien 3s 2047.	4.96	4.94	4.95	5.00	4.95	4.89	4.96	5.05	5.01	4.99	4.95	4.89	4.83
111	Atl Coast Line 1st cons M 4s 1952.	4.66	4.60	4.50	4.43	4.38	4.43	4.49	4.59	4.53	4.57	4.54	4.51	4.46
114	Pennsylvania RR cons M 4s 1948.	4.62	4.63	4.54	4.52	4.47	4.52	4.48	4.65	4.62	4.64	4.59	4.58	4.56
116	L & N (Atl Knox & Cin Div) 4s 1955.	4.70	4.68	4.64	4.56	4.52	4.59	4.63	4.74	4.61	4.63	4.61	4.60	4.59
117	Illinois Central RR ref M 4s 1955.	4.70	4.69	4.64	4.56	4.53	4.54	4.64	4.72	4.61	4.60	4.61	4.60	4.59
118	Chic Burl & Quincy gen M 4s 1958.	4.66	4.62	4.57	4.54	4.49	4.53	4.62	4.64	4.62	4.66	4.65	4.58	4.51
119	Southern Ry 1st cons M 5s 1994.	4.97	4.93	4.94	4.90	4.85	4.83	4.84	4.87	4.84	4.82	4.82	4.80	4.78
120	Un Pac RR 1st lien & ref M 4s 2008.	4.72	4.68	4.64	4.58	4.54	4.58	4.68	4.74	4.67	4.66	4.70	4.67	4.60
123	Grt Nor Ry 1st & ref M 3 1/2s 1961.	4.71	4.71	4.72	4.74	4.71	4.68	4.75	4.74	4.74	4.76	4.75	4.74	4.71
124	Canada So 1st & ref cons 5s 1962.	4.95	4.93	4.92	4.88	4.81	4.87	4.88	4.91	4.86	4.80	4.84	4.82	4.79
126	Pennsylvania RR cons M 4 1/2s 1960.	4.55	4.54	4.54	4.52	4.51	4.53	4.53	4.61	4.58	4.60	4.59	4.57	4.52
127	Canadian Nor Ry 25 yr st deb 6 1/2s 1946.	5.20	5.16	5.12	5.15	5.09	5.08	5.15	5.14	5.10	5.11	5.13	5.12	5.13
128	Grt Nor Ry gen B 5 1/2s 1952.	5.43	5.38	5.43	5.46	5.39	5.35	5.38	5.46	5.42	5.38	5.39	5.32	5.25
129	Atl Coast Line gen unified 4 1/2s 1964.	5.01	5.00	5.00	4.95	4.87	4.84	4.86	4.90	4.89	4.85	4.88	4.83	4.77
130	Pennsylvania RR gen M 4 1/2s 1965.	4.84	4.85	4.81	4.88	4.87	4.88	4.91	4.92	4.90	4.90	4.88	4.83	4.77
131	Pennsylvania RR gen M 5s 1968.	4.89	4.84	4.83	4.86	4.88	4.89	4.94	4.97	4.89	4.92	4.89	4.86	4.79
132	Grt Nor Ry gen Series C 5s 1973.	5.40	5.33	5.36	5.41	5.35	5.27	5.30	5.35	5.31	5.30	5.24	5.19	5.11
133	St Louis So Western 1st M 4s 1989.	5.02	4.98	5.01	4.97	4.88	4.88	4.85	5.02	4.89	4.85	4.80	4.78	4.78
134	Mo-Kansas-Western Ry 1st M 4s 1990.	4.94	4.92	4.98	4.93	4.79	4.76	4.86	4.86	4.81	4.82	4.80	4.75	4.74
135	Ches & Ohio Ry gen M 4 1/2s 1992.	5.10	5.04	5.06	5.05	4.95	4.91	4.97	4.92	4.94	4.94	4.88	4.86	4.84
136	Ches Cin Chi & St L Ry gen M 4s 1993.	4.85	4.89	4.91	4.87	4.80	4.77	4.82	4.87	4.81	4.81	4.79	4.76	4.74
137	N V Central RR consol M 4s 1998.	4.80	4.79	4.80	4.75	4.68	4.66	4.69	4.79	4.76	4.78	4.76	4.68	4.63
138	Tex & Pac Ry 1st M 5s 2000.	4.98	4.96	4.97	4.96	4.88	4.84	4.94	4.96	4.89	4.87	4.86	4.84	4.84
139	Leligh V RR (Pa) gen cons M 4s 2003.	5.03	5.00	5.03	4.98	4.95	4.91	4.86	5.00	4.95	4.95	4.92	4.90	4.83
140	Canadian Pac Ry 4 1/2% deb stock.	5.03	5.02	5.04	5.02	4.98	4.97	4.98	5.00	4.97	4.98	4.97	4.97	4.92

YIELDS OF RAILROAD BONDS
JAN. 1926—JAN. 1927

Ref.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361.	4.74	4.75	4.69	4.68	4.68	4.67	4.66	4.68	4.68	4.62	4.63	4.61
76	Illinois Central RR & Tl 4s 1952.	4.76	4.75	4.66	4.66	4.76	4.54	4.66	4.67	4.65	4.67	4.68	4.61
76	Ill Central (L N R & Co) col 4s 1953.	4.97	4.92	4.85	4.85	4.76	4.79	4.82	4.83	4.84	4.80	4.75	4.77
83	Lake Sh & Mich So 1st M 3 1/2s 1997.	4.47	4.41	4.41	4.38	4.38	4.38	4.45	4.47	4.45	4.44	4.34	4.35
91	Union Pac RR 1st M RR & 15 4s 1947.	4.50	4.49	4.42	4.38	4.44	4.45	4.45	4.42	4.45	4.42	4.39	4.34
92	Chicago & Nor West gen M 3 1/2s 1987.	4.70	4.70	4.67	4.61	4.63	4.61	4.64	4.64	4.62	4.63	4.59	4.51
93	Chi Rock & Pac RR 1st M 4s 1988.	4.71	4.70	4.71	4.68	4.68	4.68	4.68	4.68	4.68	4.68	4.68	4.68
94	Ach Ton & Santa Fe gen M 4s 1905.	4.44	4.43	4.44	4.37	4.34	4.32	4.33	4.36	4.37	4.34	4.34	4.27
95	N Y Cent & Hudson River M 3 1/2s 1997.	4.56	4.49	4.49	4.41	4.43	4.40	4.44	4.48	4.45	4.42	4.37	4.37
99	Oregon RR & Nav Co cons M 4s 1946.	4.69	4.68	4.76	4.63	4.62	4.60	4.62	4.63	4.63	4.62	4.61	4.58
100	Chi Bur & Q (Ill Div) M 3 1/2s 1949.	4.60	4.55	4.55	4.46	4.47	4.48	4.49	4.49	4.49	4.46	4.41	4.39
100	Chicago & N W RR 1st M 4s 1907.	4.71	4.69	4.71	4.66	4.66	4.66	4.66	4.66	4.66	4.66	4.66	4.66
102	Nor Pac RR 1st lien 1st M 4s 1997.	4.71	4.69	4.71	4.66	4.66	4.66	4.66	4.66	4.66	4.66	4.66	4.66
103	Nor Pac RR 1st cons M 4s 1906.	4.43	4.38	4.40	4.35	4.35	4.35	4.33	4.33	4.37	4.33	4.32	4.30
104	Central RR of N J gen M 5s 1987.	4.55	4.57	4.52	4.49	4.46	4.45	4.44	4.47	4.51	4.46	4.43	4.38
105	Hocking Valley 1st cons M 4 1/2s 1999.	4.90	4.87	4.84	4.76	4.71	4.67	4.70	4.67	4.71	4.62	4.59	4.58
106	Ore Sh Line RR cons 1st M 5s 1946.	4.60	4.54	4.57	4.51	4.46	4.47	4.53	4.51	4.54	4.57	4.48	4.43
108	South Pac 1st ref M 4s 1955.	4.56	4.55	4.54	4.47	4.51	4.55	4.54	4.52	4.48	4.41	4.40	4.37
109	Ill R S RR adj M 4s 1907.	4.69	4.68	4.73	4.66	4.59	4.54	4.59	4.60	4.59	4.60	4.56	4.53
110	Northern Pac Ry gen lien 5s 2047.	4.83	4.74	4.74	4.71	4.64	4.61	4.64	4.63	4.62	4.58	4.59	4.59
111	All Coast Line 1st cons M 4s 1952.	4.46	4.45	4.40	4.38	4.38	4.44	4.46	4.45	4.46	4.44	4.39	4.32
114	Pennsylvania RR cons M 4s 1948.	4.56	4.51	4.50	4.43	4.41	4.43	4.44	4.48	4.42	4.47	4.37	4.35
116	L & N (Atl Knox & Cin Div) 4s 1955.	4.58	4.53	4.52	4.47	4.40	4.51	4.56	4.56	4.52	4.51	4.45	4.37
117	Illinois Central RR ref M 4s 1955.	4.49	4.49	4.50	4.44	4.41	4.45	4.47	4.44	4.46	4.41	4.37	4.35
118	Chi Burl & Quincy gen M 4s 1958.	4.51	4.47	4.46	4.41	4.42	4.45	4.47	4.47	4.47	4.38	4.37	4.35
119	Southern Ry 1st cons M 5s 1994.	4.78	4.74	4.76	4.71	4.65	4.64	4.65	4.66	4.67	4.69	4.65	4.65
120	Un Pac RR 1st lien & ref M 4s 2003.	4.60	4.54	4.55	4.49	4.45	4.45	4.48	4.46	4.47	4.43	4.44	4.46
123	Grt Nor Ry 1st & ref M 4 1/2s 1961.	4.61	4.59	4.56	4.49	4.43	4.43	4.52	4.52	4.47	4.41	4.44	4.46
124	Canada So 1st & ref cons 5s 1962.	4.79	4.81	4.79	4.78	4.75	4.73	4.72	4.76	4.75	4.72	4.71	4.68
126	Pennsylvania RR cons M 4 1/2s 1960.	4.52	4.47	4.47	4.43	4.43	4.45	4.48	4.46	4.44	4.44	4.39	4.38
127	Canadian Nor Ry 25 yr deb 6 1/2s 1946.	5.13	5.09	5.10	5.08	5.05	5.05	5.06	5.09	5.07	5.05	5.06	5.04
127	Grt Nor Ry gen Series B 3 1/2s 1964.	4.75	4.71	4.71	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67
129	Atch Ton & Santa Fe 1st M 4s 1905.	4.75	4.71	4.69	4.62	4.58	4.61	4.62	4.61	4.63	4.57	4.53	4.50
130	Pennsylvania RR gen M 4 1/2s 1965.	4.70	4.69	4.69	4.62	4.61	4.61	4.61	4.61	4.61	4.61	4.61	4.61
131	Pennsylvania RR gen M 5s 1968.	4.79	4.75	4.72	4.68	4.67	4.66	4.71	4.70	4.70	4.64	4.60	4.55
132	Grt Nor Ry gen Series C 5s 1973.	5.11	5.07	5.01	4.96	4.89	4.88	4.97	4.97	4.93	4.88	4.87	4.83
133	St Louis So Western 1st M 4s 1989.	4.78	4.76	4.75	4.69	4.64	4.63	4.66	4.67	4.68	4.62	4.66	4.61
134	Mo-Kansas-Texas Ry 1st M 4s 1990.	4.75	4.71	4.72	4.68	4.62	4.64	4.65	4.68	4.67	4.62	4.65	4.64
135	Ches & Ohio Ry gen M 4 1/2s 1992.	4.84	4.81	4.84	4.76	4.70	4.67	4.73	4.71	4.71	4.70	4.65	4.60
136	Cleveland Chi & St Ry gen M 4s 1993.	4.74	4.71	4.72	4.65	4.64	4.60	4.63	4.65	4.63	4.57	4.52	4.50
137	N Y Central RR consl M 4s 1998.	4.63	4.59	4.60	4.56	4.49	4.53	4.55	4.52	4.54	4.50	4.47	4.42
138	Tex & Pac Ry 1st M 5s 2000.	4.84	4.80	4.83	4.77	4.74	4.71	4.70	4.78	4.73	4.74	4.71	4.68
139	Lehigh V RR (Pa) gen cons M 4s 2003.	4.83	4.82	4.81	4.79	4.74	4.74	4.64	4.67	4.68	4.67	4.66	4.64
140	Canadian Pac Ry 4 1/2 deb stock.	4.95	4.89	4.86	4.77	4.72	4.73	4.75	4.70	4.70	4.69	4.73	4.71
141	Southern Ry dev & gen M 4s 1956.	5.19	5.11	5.15	5.03	4.96	4.93	5.03	5.07	5.03	4.99	4.93	4.84

RAILROAD BOND YIELDS

A99

YIELDS OF RAILROAD BONDS
JAN. 1927—JAN. 1928

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361.....	4.61	4.59	4.55	4.49	4.53	4.57	4.56	4.47	4.45	4.36	4.35	4.31	4.32
76	Illinois Central RR coll 4s 1952.....	4.61	4.57	4.52	4.56	4.54	4.59	4.56	4.47	4.45	4.36	4.35	4.31	4.32
83	Ill Central (L N O & T) col 14s 1953.....	4.77	4.73	4.67	4.71	4.76	4.70	4.76	4.67	4.65	4.56	4.55	4.51	4.53
86	Lake Sh & Mich So 1st M 3½s 1997.....	4.35	4.37	4.30	4.31	4.36	4.34	4.32	4.20	4.15	4.12	4.10	4.06	4.08
91	Union Pac RR 1st M RR & Ig 4s 1917.....	4.34	4.33	4.28	4.22	4.20	4.24	4.22	4.19	4.19	4.12	4.10	4.10	4.11
92	Chicago & Nor West gen M 3½s 1987.....	4.51	4.49	4.43	4.31	4.30	4.31	4.38	4.31	4.28	4.23	4.20	4.17	4.16
93	Chi Rock Is & Pac Ry gen M 4s 1988.....	4.56	4.52	4.50	4.47	4.45	4.49	4.43	4.41	4.43	4.40	4.35	4.26	4.26
94	Atch Top & Santa Fe gen M 4s 1995.....	4.27	4.28	4.23	4.17	4.16	4.19	4.19	4.16	4.15	4.12	4.09	4.07	4.08
95	N Y Cent & Hudson River M 3½s 1997.....	4.37	4.40	4.32	4.21	4.21	4.28	4.28	4.25	4.15	4.14	4.10	4.06	4.06
100	Chi Bur & Q (Ill Div) M 3½s 1949.....	4.39	4.39	4.31	4.29	4.31	4.32	4.34	4.33	4.21	4.18	4.13	4.12	4.13
101	Central Pacific 1st ref M 4s 1949.....	4.57	4.59	4.56	4.49	4.49	4.52	4.50	4.46	4.45	4.45	4.43	4.30	4.30
102	Central Pacific 1st ref M 4s 1955.....	4.39	4.39	4.32	4.26	4.22	4.28	4.29	4.25	4.22	4.19	4.15	4.13	4.13
103	Nor & West RR 1st M 4s 1996.....	4.30	4.31	4.24	4.16	4.15	4.24	4.16	4.15	4.16	4.12	4.06	4.07	4.10
104	Central RR of N J gen M 5s 1987.....	4.38	4.36	4.33	4.28	4.27	4.21	4.26	4.24	4.18	4.17	4.15	4.14	4.14
105	Hocking Valley 1st cons M 4½s 1999.....	4.58	4.60	4.53	4.38	4.35	4.39	4.37	4.34	4.35	4.22	4.20	4.19	4.22
108	Southern Pac 1st ref M sl 4s 1955.....	4.37	4.39	4.31	4.24	4.21	4.31	4.33	4.27	4.23	4.17	4.14	4.13	4.15
109	A T & S Fe Ry adj M 4s stamped 1995.....	4.50	4.49	4.44	4.32	4.24	4.48	4.51	4.42	4.31	4.23	4.20	4.15	4.21
110	Northern Pac Ry gen lien 3s 2047.....	4.35	4.35	4.30	4.23	4.21	4.22	4.17	4.25	4.15	4.12	4.07	4.09	4.12
111	All Coast Line 1st cons M 4s 1952.....	4.35	4.35	4.34	4.23	4.21	4.22	4.17	4.25	4.15	4.12	4.07	4.09	4.12
114	Pennsylvania RR cons M 4s 1948.....	4.35	4.35	4.30	4.26	4.21	4.18	4.19	4.19	4.15	4.17	4.11	4.08	4.04
116	L & N (Atl Knox & Cin Div) 4s 1955.....	4.35	4.35	4.30	4.23	4.24	4.25	4.33	4.26	4.23	4.19	4.15	4.11	4.11
117	Illinois Central RR ref M 4s 1955.....	4.35	4.39	4.30	4.24	4.20	4.31	4.32	4.22	4.22	4.15	4.12	4.11	4.13
118	Chic Burt & Quincy gen M 4s 1958.....	4.35	4.36	4.28	4.23	4.21	4.24	4.25	4.23	4.19	4.16	4.10	4.11	4.13
119	Southern Ry 1st cons M 5s 1994.....	4.65	4.63	4.64	4.63	4.58	4.64	4.64	4.77	4.55	4.49	4.38	4.38	4.38
120	Un Pac RR 1st lien & ref M 4s 2008.....	4.36	4.31	4.27	4.22	4.20	4.26	4.26	4.23	4.19	4.15	4.09	4.10	4.12
124	Canada So 1st & ref cons 5s 1962.....	4.68	4.69	4.66	4.62	4.60	4.62	4.60	4.58	4.56	4.51	4.41	4.43	4.45
126	Pennsylvania RR M 2½s 1960.....	4.38	4.35	4.30	4.23	4.25	4.28	4.28	4.28	4.23	4.21	4.15	4.14	4.14
127	Canadian Nor Ry 25 yr sl deb 6½s 1946.....	5.04	5.01	4.98	4.97	4.95	4.94	4.96	4.97	4.96	4.87	4.78	4.73	4.73
128	Grt Nor Ry Series B 5½s 1952.....	4.89	4.87	4.82	4.75	4.75	4.79	4.83	4.74	4.69	4.65	4.61	4.60	4.55
129	All Coast Line gen unlfid 4½s 1964.....	4.61	4.60	4.62	4.60	4.56	4.63	4.61	4.54	4.47	4.41	4.40	4.36	4.34
130	Pennsylvania RR gen M 4½s 1965.....	4.49	4.52	4.47	4.45	4.43	4.44	4.44	4.39	4.37	4.31	4.24	4.26	4.26
131	Pennsylvania RR gen M 5s 1968.....	4.55	4.51	4.48	4.47	4.46	4.44	4.44	4.39	4.36	4.30	4.29	4.30	4.26
132	Grt Nor Ry gen Series C 5s 1973.....	4.84	4.81	4.78	4.77	4.76	4.77	4.79	4.69	4.66	4.60	4.58	4.58	4.61
133	St Louis So Western 1st M 4s 1958.....	4.61	4.62	4.62	4.61	4.58	4.58	4.57	4.55	4.51	4.45	4.38	4.37	4.40
134	Mo-Kansas-Texas Ry 1st M 4s 1990.....	4.61	4.62	4.61	4.55	4.56	4.55	4.59	4.52	4.48	4.43	4.36	4.34	4.35
135	Ches & Ohio Ry gen M 4½s 1992.....	4.60	4.62	4.60	4.57	4.56	4.59	4.55	4.51	4.46	4.42	4.38	4.36	4.36
136	Cleve Cin Chi & St L gen M 4s 1993.....	4.50	4.47	4.46	4.30	4.24	4.28	4.31	4.28	4.22	4.16	4.11	4.11	4.12
137	N Y Central RR consol M 4s 1998.....	4.42	4.40	4.35	4.29	4.30	4.32	4.31	4.26	4.20	4.14	4.11	4.13	4.13
138	Tex & Pac Ry 1st M 5s 2000.....	4.68	4.69	4.64	4.63	4.64	4.68	4.67	4.64	4.61	4.55	4.48	4.53	4.52
139	Leligh V RR (Pa) gen cons M 4s 2003.....	4.59	4.58	4.57	4.44	4.43	4.56	4.56	4.49	4.43	4.40	4.33	4.33	4.33
140	Canadian Pac Ry 4% deb stock.....	4.71	4.76	4.74	4.67	4.68	4.72	4.69	4.65	4.64	4.58	4.51	4.46	4.45
141	Chic & West RR M 4s 1956.....	4.56	4.56	4.52	4.47	4.74	4.81	4.83	4.75	4.69	4.64	4.56	4.48	4.48
142	Chic & West RR M 4s 1957.....	4.57	4.54	4.54	4.48	4.48	4.81	4.84	4.76	4.70	4.62	4.54	4.54	4.52
143	Pitts Cin Chi & St L gen M 5s 1975.....	4.57	4.59	4.54	4.48	4.50	4.55	4.55	4.50	4.45	4.41	4.33	4.29	4.27
144	Grt Nor Ry gen M 4½s 1976.....	4.77	4.77	4.73	4.61	4.62	4.64	4.66	4.57	4.55	4.54	4.48	4.47	4.46

YIELDS OF RAILROAD BONDS
Jan. 1928—Jan. 1929

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361.	4.32	4.35	4.33	4.31	4.26	4.41	4.52	4.63	4.61	4.59	4.48	4.37	4.62
83	Ill Central (L N O & T) col 4s 1953.	4.42	4.46	4.44	4.44	4.55	4.50	4.72	4.69	4.69	4.74	4.66	4.83	4.80
88	Lake Sh & Mich So 1st M 3 1/2s 1997.	4.08	4.10	4.15	4.10	4.14	4.27	4.28	4.27	4.31	4.33	4.34	4.39	4.39
91	Union Pac RR 1st M RR & lg 4s 1947.	4.11	4.15	4.28	4.10	4.33	4.37	4.37	4.37	4.42	4.48	4.44	4.52	4.58
93	Chi Rock Is & Pac Ry gen M 4s 1988.	4.26	4.31	4.29	4.29	4.33	4.37	4.37	4.37	4.42	4.48	4.44	4.52	4.58
94	Atch Top & Santa Fe gen M 4s 1995.	4.08	4.11	4.11	4.13	4.17	4.24	4.29	4.33	4.30	4.31	4.29	4.33	4.33
95	N V Cent & Hudson River M 3 1/2s 1997.	4.06	4.09	4.11	4.12	4.15	4.21	4.33	4.36	4.33	4.34	4.35	4.31	4.37
101	Central Pacific 1st ref M 4s 1946.	4.30	4.37	4.30	4.33	4.55	4.59	4.53	4.63	4.63	4.63	4.52	4.54	4.54
102	Nor Pac Ry prior lien lg M 4s 1997.	4.10	4.12	4.10	4.10	4.16	4.16	4.16	4.16	4.16	4.16	4.16	4.16	4.16
103	Nor Pac Ry 1st cons M 4s 1996.	4.10	4.12	4.11	4.11	4.18	4.24	4.34	4.33	4.33	4.32	4.30	4.36	4.39
104	Central RR of N J gen M 5s 1987.	4.14	4.18	4.21	4.22	4.24	4.24	4.45	4.55	4.43	4.38	4.39	4.41	4.49
105	Hocking Valley 1st cons M 4 1/2s 1999.	4.22	4.28	4.35	4.35	4.45	4.52	4.54	4.53	4.53	4.53	4.46	4.53	4.55
106	Southern Pac 1st ref M 4s 1955.	4.15	4.15	4.22	4.23	4.25	4.27	4.56	4.52	4.51	4.51	4.51	4.56	4.63
109	N Y R S RR adj M 4s stand 1995.	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34	4.34
110	Northern Pac Ry gen lien 3s 2047.	4.24	4.24	4.25	4.29	4.30	4.40	4.56	4.60	4.55	4.56	4.53	4.48	4.53
111	All Coast Line 1st cons M 4s 1952.	4.12	4.17	4.15	4.23	4.23	4.35	4.44	4.52	4.37	4.46	4.48	4.54	4.62
114	Pennsylvania RR cons M 4s 1948.	4.04	4.13	4.21	4.18	4.12	4.17	4.37	4.50	4.50	4.43	4.43	4.50	4.55
117	Illinois Central RR ref M 4s 1955.	4.13	4.16	4.18	4.20	4.25	4.36	4.43	4.57	4.36	4.40	4.36	4.44	4.46
118	Chic & West Ind RR cons M 4s 1958.	4.13	4.16	4.18	4.20	4.25	4.36	4.43	4.57	4.36	4.40	4.36	4.44	4.46
119	Southern Ry 1st cons M 5s 1994.	4.38	4.36	4.29	4.53	4.56	4.48	4.51	4.57	4.50	4.49	4.43	4.50	4.55
120	Un Pac RR 1st lien & ref M 4s 2008.	4.12	4.11	4.16	4.16	4.22	4.31	4.38	4.45	4.41	4.41	4.39	4.46	4.47
124	Canada So 1st & ref cons M 5s 1962.	4.45	4.45	4.46	4.44	4.50	4.57	4.58	4.59	4.69	4.62	4.59	4.71	4.63
126	Pennsylvania RR cons M 4 1/2s 1960.	4.14	4.18	4.21	4.22	4.26	4.39	4.41	4.50	4.50	4.50	4.48	4.57	4.57
127	Canadian Nor R 25 yr lien 4s 1946.	4.35	4.38	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41
127	Grt Nor Ry gen Series B 5 1/2s 1952.	4.55	4.64	4.65	4.70	4.74	4.82	4.95	4.95	4.92	4.83	4.77	4.82	4.83
129	All Coast Line gen unified 4 1/2s 1964.	4.34	4.36	4.37	4.38	4.42	4.50	4.47	4.66	4.59	4.56	4.56	4.66	4.64
130	Pennsylvania RR gen M 4 1/2s 1965.	4.26	4.28	4.31	4.34	4.38	4.46	4.45	4.56	4.45	4.48	4.44	4.54	4.52
131	Pennsylvania RR gen M 5s 1968.	4.28	4.31	4.38	4.38	4.40	4.51	4.51	4.73	4.81	4.74	4.66	4.72	4.82
132	Grt Nor Ry gen Series C 5s 1961.	4.39	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41	4.41
133	St Louis Southern 1st M 4s 1989.	4.40	4.39	4.38	4.43	4.57	4.60	4.65	4.67	4.60	4.67	4.60	4.57	4.62
134	Mo-Kansas-Texas Ry 1st M 4s 1990.	4.35	4.36	4.37	4.43	4.46	4.58	4.64	4.67	4.63	4.56	4.56	4.68	4.77
135	Ches & Ohio Ry gen M 4 1/2s 1992.	4.36	4.35	4.34	4.41	4.44	4.51	4.52	4.58	4.63	4.54	4.52	4.54	4.58
140	Cleve Cin Chi & St L gen M 4s 1993.	4.12	4.14	4.15	4.16	4.20	4.33	4.36	4.42	4.30	4.40	4.37	4.47	4.47
142	N Y Central RR cons M 4s 1998.	4.12	4.14	4.15	4.16	4.20	4.33	4.36	4.42	4.30	4.40	4.37	4.47	4.47
143	Tch & Pac Ry 1st M 5s 2000.	4.12	4.14	4.15	4.16	4.20	4.33	4.36	4.42	4.30	4.40	4.37	4.47	4.47
139	Lehigh V RR (P) gen cons M 4s 2003.	4.33	4.37	4.40	4.39	4.41	4.48	4.52	4.57	4.54	4.57	4.51	4.57	4.61
140	Canadian Pac Ry 4 1/2 deb stock.	4.39	4.42	4.41	4.41	4.47	4.53	4.58	4.58	4.58	4.58	4.54	4.53	4.62
141	Southern Ry dev & gen M 4s 1956.	4.48	4.50	4.49	4.53	4.58	4.63	4.85	4.85	4.72	4.74	4.68	4.66	4.80
142	Chic & West Ind RR cons M 4s 1952.	4.57	4.55	4.53	4.57	4.63	4.68	4.70	4.70	4.63	4.60	4.49	4.57	4.58
143	Phils Cin Chi & St L gen M 5s 1973.	4.21	4.30	4.31	4.37	4.44	4.54	4.67	4.70	4.63	4.60	4.49	4.57	4.58
144	Great Nor Ry gen M 4 1/2s 1976.	4.16	4.51	4.50	4.49	4.49	4.56	4.60	4.64	4.60	4.56	4.55	4.66	4.74
145	Chi Mil & St Paul Ry gen M 4s 1989.	4.35	4.34	4.34	4.35	4.40	4.53	4.63	4.71	4.67	4.65	4.60	4.64	4.73
146	Br R RR cons prior lien 4s 1996.	4.18	4.16	4.16	4.19	4.23	4.09	4.73	4.82	4.70	4.69	4.65	4.77	4.73

RAILROAD BOND YIELDS

A101

YIELDS OF RAILROAD BONDS
Jan. 1929—Jan. 1930

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361.	4.62	4.65	4.69	4.64	4.63	4.72	4.73	4.59	4.68	4.69	4.62	4.56	4.57
83	Ill Central (L N O & T) col 4s 1953.	4.39	4.39	4.53	4.94	4.97	5.07	5.08	5.10	5.07	4.87	4.85	4.85	4.84
88	Lake Sh & Mich So 1st M 3 1/2s 1997.	4.30	4.49	4.40	4.45	4.47	4.66	4.70	4.76	4.76	4.76	4.76	4.76	4.76
90	Chic & Pac RR 1st M 4s 1915.	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40
93	Chic Rock Is & Pac RR 1st M 4s 1988.	4.38	4.60	4.61	4.67	4.63	4.69	4.71	4.76	4.91	4.64	4.61	4.56	4.55
94	Atch Top & Santa Fe gen M 4s 1995.	4.33	4.39	4.40	4.35	4.38	4.41	4.42	4.42	4.44	4.39	4.32	4.29	4.32
95	N Y Cent & Hudson River M 3 1/2s 1997.	4.37	4.51	4.47	4.47	4.50	4.50	4.61	4.55	4.71	4.58	4.44	4.37	4.42
101	Central Pacific 1st ref M 4s 1949.	4.22	4.70	4.73	4.66	4.72	4.82	4.84	4.74	4.85	4.76	4.63	4.67	4.60
109	Nor Pac Ry prior lien M 4s 1997.	4.38	4.54	4.48	4.38	4.45	4.73	4.75	4.73	4.73	4.60	4.40	4.37	4.36
103	Nor & West Ry 1st cons M 4s 1996.	4.39	4.41	4.47	4.43	4.45	4.42	4.46	4.46	4.50	4.46	4.45	4.37	4.36
104	Central RR of N J gen M 5s 1987.	4.49	4.53	4.59	4.57	4.54	4.58	4.67	4.65	4.67	4.59	4.59	4.55	4.58
105	Hocking Valley 1st cons M 4 1/2s 1999.	4.55	4.57	4.64	4.70	4.77	4.76	4.75	4.88	4.87	4.87	4.77	4.64	4.63
108	Southern Pac 1st ref M 4s 1955.	4.52	4.54	4.61	4.59	4.61	4.70	4.75	4.82	4.80	4.77	4.77	4.63	4.55
110	A T & S Fe Ry adj M 4s stamped 1995.	4.63	4.70	4.72	4.70	4.60	4.77	4.75	4.91	4.71	4.62	4.50	4.45	4.52
110	Northern Pac Ry gen lien 3s 2047.	4.53	4.59	4.66	4.71	4.80	4.77	4.72	4.73	4.80	4.86	4.68	4.63	4.67
111	At Coast Line 1st cons M 4s 1952.	4.62	4.58	4.62	4.68	4.71	4.70	4.71	4.62	4.74	4.79	4.54	4.46	4.53
114	Pennsylvania RR cons M 4s 1948.	4.53	4.54	4.54	4.57	4.60	4.66	4.73	4.68	4.68	4.62	4.61	4.59	4.48
117	Illinois Central RR ref M 4s 1955.	4.55	4.53	4.61	4.62	4.63	4.67	4.77	4.82	4.83	4.79	4.64	4.60	4.59
118	Chic Burl & Quincy gen M 4s 1958.	4.46	4.53	4.52	4.56	4.56	4.71	4.66	4.72	4.69	4.71	4.53	4.49	4.57
119	Southern Ry 1st cons M 5s 1994.	4.58	4.58	4.64	4.63	4.66	4.73	4.75	4.73	4.72	4.71	4.68	4.65	4.61
120	Un Pac RR 1st lien & ref M 4s 2008.	4.47	4.53	4.58	4.56	4.57	4.64	4.66	4.63	4.65	4.59	4.47	4.44	4.45
124	Canada So 1st & ref cons 5s 1962.	4.65	4.75	4.77	4.74	4.79	4.90	4.90	4.91	4.90	4.93	4.86	4.77	4.82
126	Pennsylvania RR cons M 4 1/2s 1960.	4.46	4.46	4.46	4.47	4.52	4.56	4.56	4.49	4.59	4.63	4.46	4.48	4.44
128	Camden Nor Ry 25 yr st deb 6 1/2s 1946.	5.17	5.17	5.17	5.20	5.24	5.31	5.28	5.27	5.27	5.27	5.26	5.23	5.23
128	Grt Nor Ry gen Series B 5 1/2s 1952.	4.53	4.55	5.02	5.00	4.90	4.90	5.02	5.02	5.03	4.98	5.00	4.89	4.85
129	Atl Coast Line gen unified 4 1/2s 1964.	4.64	4.76	4.85	4.73	4.62	4.71	4.85	4.86	4.83	4.80	4.64	4.57	4.65
130	Pennsylvania RR gen M 4 1/2s 1965.	4.52	4.53	4.59	4.57	4.61	4.66	4.79	4.76	4.76	4.70	4.68	4.63	4.58
131	Pennsylvania RR gen M 5s 1948.	4.58	4.63	4.62	4.64	4.70	4.74	4.80	4.75	4.73	4.69	4.73	4.65	4.60
132	Grt Nor Ry gen Series C 5s 1973.	4.82	4.85	4.94	4.86	4.81	4.89	4.90	4.93	4.90	4.87	4.85	4.76	4.77
133	St Louis Southern 1st M 4s 1989.	4.62	4.59	4.74	4.83	4.90	4.82	4.90	4.94	5.00	4.86	4.76	4.67	4.67
134	Mo-Kansas-Texas Ry 1st M 4s 1990.	4.77	4.77	4.88	4.79	4.86	4.87	4.83	4.91	4.96	4.86	4.74	4.64	4.67
135	Ches & Ohio Ry gen M 4 1/2s 1992.	4.58	4.70	4.73	4.66	4.62	4.69	4.65	4.74	4.76	4.70	4.66	4.59	4.59
136	Cleve Cin Chi & St L gen M 4s 1993.	4.47	4.56	4.53	4.57	4.57	4.73	4.73	4.73	4.72	4.69	4.67	4.51	4.49
137	N Y Central RR consol M 4s 1998.	4.52	4.54	4.59	4.60	4.61	4.68	4.66	4.52	4.65	4.53	4.45	4.49	4.50
138	Pac & Pac Ry 1st M 5s 2000.	4.59	4.61	4.72	4.69	4.69	4.81	4.81	4.82	4.89	4.78	4.73	4.67	4.65
139	Lehigh V RR (Pa) gen cons M 4s 2003.	4.61	4.73	4.75	4.72	4.71	4.75	4.76	4.79	4.77	4.68	4.71	4.53	4.54
140	Canadian Pac Ry 4 1/2s deb stock.	4.71	4.75	4.76	4.68	4.80	4.81	4.85	4.83	4.92	4.84	4.71	4.71	4.71
141	Southern Ry deb & gen M 4s 1956.	4.80	4.93	5.05	4.89	4.89	4.96	4.98	4.94	5.00	4.92	4.80	4.67	4.71
142	Chic & West Ind RR cons M 4s 1952.	4.85	4.93	5.04	5.07	5.16	5.19	5.14	5.15	5.10	5.05	5.02	4.86	4.95
143	Pitts Cin Chi & St L gen M 5s 1975.	4.58	4.61	4.65	4.62	4.69	4.81	4.81	4.76	4.78	4.73	4.82	4.67	4.63
144	Cent Nor Ry gen M 4 1/2s 1976.	4.73	4.82	4.84	4.80	4.82	4.84	4.85	4.91	4.84	4.75	4.77	4.68	4.68
145	Chi Mil & St Paul Ry gen M 4s 1989.	4.74	4.83	4.91	4.83	4.93	4.92	4.92	4.97	4.91	4.85	4.73	4.70	4.70
145	Ente RR cons prior lien 4s 1996.	4.73	4.75	4.79	4.89	4.87	4.92	4.92	4.97	4.94	4.89	4.83	4.67	4.66

YIELDS OF RAILROAD BONDS
JAN. 1930—JAN. 1931

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361	4.57	4.82	4.46	4.51	4.51	4.49	4.39	4.40	4.28	4.26	4.31	4.30	4.32
83	Ill Central (L N O & T) col 4s 1953	4.84	4.82	4.70	4.73	4.73	4.73	4.69	4.64	4.66	4.74	4.84	4.84	4.97
88	Lake Sh & Mich So 1st M 3 1/2s 1997	4.31	4.46	4.38	4.40	4.40	4.39	4.35	4.35	4.16	4.16	4.11	4.11	4.17
92	Chic & West RR 1st M 4s 1988	4.55	4.56	4.47	4.50	4.47	4.45	4.40	4.31	4.24	4.23	4.30	4.30	4.28
93	Chi Rock Is & Pac Ry gen M 4s 1988	4.55	4.56	4.47	4.50	4.47	4.45	4.40	4.31	4.24	4.23	4.30	4.30	4.28
94	Arch Top & Santa Fe gen M 4s 1995	4.32	4.33	4.25	4.29	4.26	4.23	4.16	4.13	4.11	4.08	4.13	4.14	4.07
95	N Y Cent & Hudson River M 3 1/2s 1997	4.42	4.47	4.39	4.48	4.44	4.40	4.31	4.22	4.18	4.13	4.27	4.27	4.33
101	Central Pacific 1st ref M 4s 1949	4.50	4.53	4.48	4.48	4.48	4.47	4.36	4.24	4.21	4.21	4.27	4.27	4.32
102	Central Pacific 2nd ref M 4s 1949	4.50	4.53	4.48	4.48	4.48	4.47	4.36	4.24	4.21	4.21	4.27	4.27	4.32
103	Nor & West Ry 1st cons M 4s 1966	4.36	4.37	4.33	4.30	4.33	4.29	4.21	4.15	4.14	4.12	4.13	4.15	4.09
104	Central RR of N J gen M 5s 1987	4.58	4.53	4.47	4.45	4.44	4.44	4.43	4.39	4.29	4.35	4.40	4.55	4.55
105	Rocking Valley 1st cons M 4 1/2s 1999	4.63	4.63	4.58	4.61	4.58	4.60	4.58	4.58	4.52	4.52	4.56	4.56	4.52
106	Rocking Valley 2nd cons M 4 1/2s 1999	4.63	4.63	4.58	4.61	4.58	4.60	4.58	4.58	4.52	4.52	4.56	4.56	4.52
109	A T & S Pac Ry 1st M 4s 1985	4.47	4.47	4.39	4.43	4.43	4.43	4.37	4.36	4.23	4.24	4.35	4.36	4.19
110	Northern Pac Ry gen lien 3s 2047	4.67	4.59	4.44	4.55	4.58	4.57	4.52	4.38	4.33	4.38	4.46	4.55	4.47
111	Atl Coast Line 1st cons M 4s 1952	4.53	4.57	4.48	4.58	4.49	4.36	4.31	4.27	4.24	4.27	4.32	4.59	4.26
114	Pennsylvania RR cons M 4s 1948	4.48	4.61	4.42	4.41	4.42	4.43	4.30	4.21	4.35	4.57	4.22	4.60	4.13
115	Chic & West RR 1st M 4s 1988	4.57	4.48	4.45	4.46	4.38	4.40	4.30	4.23	4.19	4.17	4.21	4.33	4.14
118	Chic & West RR 2nd M 4s 1988	4.57	4.48	4.45	4.46	4.38	4.40	4.30	4.23	4.19	4.17	4.21	4.33	4.14
119	Southern Ry 1st cons M 5s 1994	4.61	4.62	4.53	4.56	4.54	4.55	4.39	4.37	4.35	4.56	4.66	4.68	4.54
120	Un Pac RR 1st lien & ref M 4s 2008	4.45	4.46	4.40	4.43	4.44	4.38	4.33	4.26	4.17	4.17	4.31	4.31	4.19
124	Canada So 1st & ref cons 5s 1962	4.82	4.77	4.73	4.70	4.71	4.72	4.65	4.63	4.50	4.50	4.56	4.71	4.60
128	Pennsylvania RR cons M 5s 1968	4.60	4.65	4.58	4.58	4.55	4.50	4.47	4.43	4.30	4.30	4.38	4.59	4.48
129	Gt Northern RR cons M 5 1/2s 1950	4.85	4.81	4.81	4.73	4.73	4.69	4.68	4.70	4.66	4.71	4.80	5.01	4.78
132	Sgt Nor gen Series C 1st M 4s 1989	4.67	4.68	4.59	4.62	4.60	4.60	4.57	4.51	4.43	4.46	4.48	4.64	4.71
133	Mo-Kansas-Texas Ry 1st M 4s 1990	4.67	4.69	4.62	4.62	4.61	4.59	4.59	4.48	4.33	4.48	4.54	4.56	4.48
134	Pennsylvania RR gen M 4 1/2s 1965	4.58	4.58	4.52	4.51	4.51	4.50	4.45	4.38	4.33	4.33	4.45	4.46	4.30
135	Pennsylvania RR gen M 5s 1968	4.60	4.65	4.58	4.58	4.55	4.50	4.47	4.43	4.30	4.30	4.45	4.71	4.59
136	Sgt Nor gen Series C 1st M 4s 1989	4.67	4.68	4.59	4.62	4.60	4.60	4.57	4.51	4.43	4.46	4.48	4.64	4.71
137	Chic & West RR 1st M 4s 1988	4.57	4.57	4.49	4.52	4.51	4.50	4.45	4.38	4.33	4.33	4.45	4.56	4.48
138	Chic & West RR 2nd M 4s 1988	4.57	4.57	4.49	4.52	4.51	4.50	4.45	4.38	4.33	4.33	4.45	4.56	4.48
139	Lehigh V RR (Pa) gen cons M 4s 2003	4.54	4.59	4.50	4.52	4.50	4.51	4.47	4.37	4.33	4.36	4.52	4.79	4.58
140	Canadian Pac Ry 4% deb stock	4.71	4.76	4.64	4.66	4.63	4.56	4.50	4.45	4.46	4.48	4.51	4.58	4.54
141	Southern Ry dev & gen M 4s 1956	4.71	4.70	4.59	4.65	4.60	4.68	4.68	4.70	4.68	4.83	5.05	5.16	4.95
142	Chic & West RR cons M 4s 1952	4.95	5.01	4.79	4.81	4.79	4.78	4.72	4.71	4.52	4.52	4.74	5.08	4.77
143	Chic & West RR 2nd M 4s 1988	4.68	4.71	4.66	4.63	4.61	4.56	4.56	4.53	4.47	4.54	4.60	4.71	4.59
144	Great Nor Ry gen M 4 1/2s 1976	4.68	4.71	4.66	4.63	4.61	4.56	4.56	4.53	4.47	4.54	4.60	4.71	4.59
145	Chi Mil & St Paul Ry gen M 4s 1989	4.70	4.79	4.69	4.74	4.72	4.70	4.75	4.71	4.65	4.71	4.76	5.01	4.79
146	Erie RR cons prior lien 4s 1996	4.66	4.66	4.65	4.71	4.64	4.61	4.62	4.67	4.53	4.56	4.76	5.01	4.66

RAILROAD BOND YIELDS

A103

YIELDS OF RAILROAD BONDS
JAN. 1931—JAN. 1932

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
77	West Shore RR 1st M 4s 2361	4.32	4.34	4.35	4.35	4.33	4.35	4.36	4.34	4.76	4.80	5.08	5.76	5.63
78	Lake Sh. & Mich. So. 1st M 3 1/2s 1997	4.13	4.14	4.14	4.17	4.11	4.11	4.16	4.34	4.30	4.61	4.73	4.96	4.86
80	Chion Pac RR 1st M RR & 1s 4s 1947	4.17	4.02	4.09	4.08	3.92	3.93	3.89	3.94	4.08	4.50	4.50	5.02	4.91
91	Chi. Rock Is. & Pac Ry gen M 4s 1938	4.28	4.35	4.32	4.35	4.40	4.38	4.50	4.60	4.86	5.20	5.33	5.72	5.52
94	Atch. Top & Santa Fe gen M 4s 1935	4.01	4.05	4.10	4.03	4.00	4.01	4.01	4.02	4.15	4.36	4.43	4.73	4.65
95	N Y Cent. & Hudson River M 3 1/2s 1997	4.13	4.15	4.18	4.18	4.14	4.18	4.22	4.31	4.33	4.68	4.79	5.01	4.94
101	Central Pacific 1st ref M 4s 1949	4.28	4.30	4.26	4.27	4.17	4.21	4.21	4.20	4.35	5.07	5.45	6.08	5.95
102	Nor. Pac Ry prior lien lg M 4s 1997	4.25	4.28	4.27	4.33	4.29	4.26	4.27	4.42	4.46	4.85	4.92	5.25	5.11
103	Nor. & West Ry 1st cons M 4s 1996	4.09	4.10	4.09	4.05	4.01	4.00	4.01	4.01	4.12	4.32	4.37	4.57	4.57
104	Central & West Ry of N J gen M 5s 1987	4.35	4.35	4.35	4.36	4.32	4.35	4.36	4.31	4.62	4.79	4.90	4.71	5.34
105	Hocking Valley 1st cons M 4 1/2s 1999	4.32	4.34	4.32	4.33	4.27	4.32	4.31	4.38	4.67	5.14	5.05	5.35	5.45
108	Southern Pac 1st ref M 4s 1955	4.25	4.24	4.25	4.27	4.18	4.24	4.24	4.33	4.60	5.11	5.13	5.69	5.59
109	A. T. & S. Fe Ry adj. M 4s stamped 1995	4.19	4.20	4.21	4.24	4.15	4.17	4.15	4.19	4.42	4.69	4.91	5.22	4.99
110	Northern Pac Ry gen lien 3s 2047	4.37	4.44	4.43	4.51	4.53	4.44	4.45	4.62	4.86	5.12	5.14	5.74	5.38
111	Atl. Coast Line 1st cons M 4s 1952	4.26	4.27	4.24	4.31	4.22	4.28	4.20	4.25	4.33	4.80	5.07	5.85	5.88
114	Pennsylvania RR cons M 4s 1948	4.13	4.09	4.13	4.07	4.00	4.04	4.03	4.02	4.22	4.70	4.73	5.08	4.85
118	Chion. Ry & Ont. Ry cons M 4s 1958	4.54	4.56	4.53	4.63	4.06	4.03	4.05	4.75	4.69	5.38	5.59	6.38	4.95
119	Southern Ry 1st M 5s 1994	4.54	4.56	4.53	4.63	4.06	4.03	4.05	4.75	4.69	5.38	5.59	6.38	4.95
120	Un. Pac RR 1st. lien & ref M 4s 2008	4.19	4.21	4.20	4.23	4.13	4.13	4.13	4.16	4.37	4.70	4.79	5.33	5.24
124	Canada So. 1st. & ref cons 3s 1962	4.60	4.55	4.52	4.58	4.55	4.58	4.58	4.62	4.87	5.37	5.24	6.79	6.38
126	Pennsylvania RR cons M 4 1/2s 1960	4.13	4.15	4.16	4.12	4.11	4.13	4.17	4.24	4.33	4.56	4.73	4.94	5.02
128	Grt. Nor. Ry gen Series B 5 1/2s 1952	4.78	4.80	4.76	4.82	4.75	4.81	4.88	5.38	6.10	6.49	6.69	8.17	7.55
129	North. Pac Ry 1st. lien & ref M 4s 1952	4.30	4.32	4.30	4.34	4.26	4.30	4.30	4.34	4.59	4.73	5.86	5.97	6.07
130	Pennsylvania RR M 4s 1963	4.30	4.32	4.30	4.34	4.26	4.30	4.30	4.34	4.59	4.73	5.86	5.97	6.07
131	Pennsylvania RR gen M 5s 1968	4.48	4.45	4.46	4.51	4.47	4.52	4.52	4.64	5.05	5.10	5.23	5.95	5.61
132	Grt. Nor. Ry gen Series C 5s 1973	4.74	4.68	4.69	4.78	4.72	4.86	4.88	5.35	5.85	6.78	6.26	7.14	6.83
133	St. Lou. & So. Western 1st M 4s 1989	4.71	4.71	4.68	4.90	5.21	5.36	5.28	5.44	5.44	6.77	6.82	7.70	6.60
134	Mo.-Kansas-Texas Ry 1st M 4s 1990	4.48	4.44	4.44	4.53	4.56	4.58	4.55	4.63	4.91	5.41	5.31	5.88	5.24
135	Ches. & Ohio Ry gen M 4 1/2s 1992	4.27	4.28	4.26	4.25	4.25	4.25	4.25	4.22	4.41	4.73	4.79	5.31	5.03
136	Cleve. Cin. Chi. & St. L. gen M 4s 1993	4.21	4.23	4.23	4.31	4.25	4.31	4.31	4.62	5.00	5.16	5.39	5.99	5.39
137	N Y Cent. RR cons M 4s 1998	4.17	4.16	4.19	4.27	4.25	4.28	4.27	4.45	4.62	4.86	5.08	5.80	5.87
138	Tex. & Pac Ry 1st. M 5s 2000	4.48	4.45	4.48	4.51	4.54	4.61	4.60	4.82	4.87	5.16	5.16	5.81	5.87
139	Lehigh V. RR (Pa.) gen cons M 4s 2003	4.58	4.54	4.63	4.70	4.70	4.70	4.66	4.94	4.95	6.29	6.32	7.88	7.72
140	Canadian Pac Ry 4 1/2% deb. stock	4.54	4.59	4.56	4.54	4.53	4.62	4.73	4.85	5.70	6.34	5.82	6.52	6.82
142	Chi. & West. Ind. RR cons M 4s 1952	4.77	4.74	4.68	4.69	4.72	4.76	4.67	5.00	5.49	5.96	6.32	7.31	6.55
143	Pitts. Cin. Chi. & St. L. gen M 5s 1975	4.50	4.53	4.51	4.55	4.52	4.57	4.54	4.88	5.00	5.09	5.19	5.65	5.54
144	Great Nor. Ry gen M 4 1/2s 1976	4.27	4.28	4.27	4.30	4.26	4.30	4.27	4.50	4.78	5.08	5.15	7.42	6.58
145	Chi. Mil. & St. Paul Ry gen M 4s 1989	4.70	4.68	4.71	5.05	4.93	4.90	4.90	4.97	5.34	6.07	6.46	7.33	6.58
146	Erie RR cons prior lien 4s 1996	4.66	4.70	4.58	4.61	4.60	4.60	4.64	4.58		5.54	5.71	6.73	5.89

YIELDS OF RAILROAD BONDS
Jan. 1932—Jan. 1933

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361	5.63	5.52	5.44	5.93	5.82	5.84	5.80	5.38	5.38	5.35	5.59	5.84	5.52
88	Lake Sh & Mich So 1st M 3 1/2s 1907	4.86	4.80	4.78	4.81	4.94	4.94	4.96	4.74	4.62	4.55	4.71	4.78	4.50
94	Atch Top & Santa Fe gen M 4s 1905	4.65	4.70	4.56	4.77	5.06	5.04	4.79	4.50	4.34	4.32	4.42	4.32	4.20
95	N Y Cent & Hudson River M 3 1/2s 1907	4.94	4.92	4.84	4.98	4.98	5.00	5.01	4.67	4.34	4.69	4.89	4.81	4.55
101	Central Pacific 1st ref M 4s 1949	5.95	6.06	5.72	6.66	8.36	8.57	7.06	5.72	5.39	5.57	5.84	6.08	5.62
102	Nor Pac Ry prior lien lg M 4s 1907	5.11	5.16	5.14	5.13	5.62	5.63	5.15	4.85	4.79	4.85	4.96	4.93	4.74
103	Nor Pac Ry 1st cons M 4s 1906	4.57	4.51	4.46	4.48	4.77	4.84	4.64	4.33	4.25	4.24	4.21	4.13	4.06
104	Chic & N W Ry 1st cons M 4s 1907	5.34	5.52	5.46	6.28	6.47	6.38	6.34	5.63	5.37	5.46	5.41	5.40	5.41
105	Hocking Valley 1st cons M 4 1/2s 1909	5.44	5.38	5.01	5.42	6.54	6.01	5.77	4.95	4.94	5.02	5.08	4.67	5.08
108	Southern Pac 1st ref M 4s 1955	5.59	5.75	5.48	6.28	7.66	7.73	6.88	5.80	5.48	5.64	5.99	6.28	5.98
109	A T & S T Ry adj M 4s stamped 1905	4.99	5.23	4.95	5.18	5.61	5.74	5.22	4.90	4.84	4.88	4.94	4.89	4.68
110	Northern Pac Ry gen lien 3s 2047	5.38	5.13	5.13	5.45	5.74	5.71	5.28	4.89	4.95	4.86	5.02	5.38	5.11
114	Pennsylvania RR cons M 4s 1948	4.85	4.92	5.01	5.10	5.15	5.25	5.06	4.49	4.66	4.52	4.91	4.31	4.06
118	Chic Burl & Quincy gen M 4s 1958	4.96	5.11	4.92	5.12	5.25	5.48	5.14	4.75	4.61	4.69	4.77	4.78	4.34
120	Un Pac RR 1st lien & ref M 4s 2008	5.24	5.07	4.93	5.30	5.40	5.40	4.82	4.67	4.69	4.82	4.82	4.80	4.34
124	Canada So 1st & ref cons 5s 1962	6.38	6.28	5.93	6.45	6.69	6.76	7.01	6.28	5.82	5.80	5.97	6.50	6.23
126	Pennsylvania RR cons M 4 1/2s 1960	5.02	5.00	4.79	4.96	4.97	5.20	5.06	4.78	4.66	4.63	4.57	4.46	4.29
130	Pennsylvania RR gen M 4 1/2s 1965	5.60	5.87	5.91	6.45	7.76	7.81	6.75	5.98	5.62	5.71	5.87	5.91	5.51
131	Pennsylvania RR gen M 5s 1968	5.61	5.72	5.83	6.33	7.56	7.96	6.76	5.91	5.51	5.63	5.81	5.95	5.56
133	St Louis So Western 1st M 4s 1989	6.60	6.34	6.41	6.95	7.82	7.88	7.08	5.79	6.10	6.12	6.07	6.08	6.66
134	Mo-Kansas-Texas Ry 1st M 4s 1990	5.24	5.41	5.56	5.81	6.54	6.53	5.80	5.28	5.31	5.28	5.40	5.48	5.11
135	Ches & Ohio Ry gen M 4 1/2s 1992	5.63	5.57	5.56	5.70	5.78	5.86	5.20	4.90	5.33	5.32	5.77	5.48	4.42
137	N Y Cent & H R 1st cons M 4s 1908	5.57	5.54	5.46	5.90	6.18	6.59	6.55	5.44	5.24	5.41	5.37	5.41	5.44
138	Tex & Pac Ry 1st M 5s 2000	5.87	5.60	5.70	6.38	6.07	6.01	5.94	5.50	5.49	5.60	5.70	5.90	5.24
140	Canadian Pac Ry 4% deb stock	6.52	6.67	6.15	6.61	7.51	7.65	6.82	5.78	5.67	5.68	6.08	6.18	6.15
143	Pitts Cin Chi & St L gen M 5s 1975	5.54	5.75	5.54	6.30	6.99	8.29	7.42	5.73	5.72	5.76	5.83	5.90	5.88
146	Erie RR cons prior lien 4s 1990	5.89	5.62	6.03	6.60	6.59	7.08	6.15	5.53	5.33	5.41	5.49	6.00	5.50
147	Pennsylvania RR gen M 4 1/2s 1981	5.83	5.98	5.89	6.14	7.45	7.76	6.69	5.77	5.57	5.60	5.80	6.07	5.80
148	Chicago & Erie 1st 5s 1982	6.29	6.07	5.97	6.15	6.40	6.76	6.33	5.98	5.63	5.60	5.66	5.38	5.45
149	C & O (Rich & All Div) 1st 4s 1989	5.23	5.14	5.03	5.77	5.39	5.40	5.35	4.94	4.93	4.68	4.52	4.57	4.31
150	C C & St L (St L Div) 1st 4s 1990	6.25	5.98	5.55	5.60	5.72	6.06	5.98	5.57	5.36	5.40	5.40	5.40	5.42

RAILROAD BOND YIELDS

A105

YIELDS OF RAILROAD BONDS
Jan. 1933—Jan. 1934

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361.....	5.52	5.30	5.45	5.73	5.42	5.11	4.88	4.75	4.80	4.93	5.48	5.67	5.37
88	Lake Sh & Mich So 1st M 3½s 1997.....	4.50	4.47	4.61	4.76	4.53	4.53	4.27	4.18	4.19	4.39	4.31	4.40	4.23
94	Atch Top & Santa Fe gen M 4s 1995.....	4.20	4.36	4.45	4.68	4.50	4.31	4.22	4.17	4.33	4.27	4.56	4.40	4.23
95	N Y Cent & Hudson River M 3½s 1997.....	4.55	4.59	4.73	4.98	4.80	4.60	4.39	4.28	4.39	4.34	4.58	4.56	4.34
101	Central Pacific 1st ref M 4s 1949.....	5.62	6.29	6.92	7.46	6.45	5.73	5.28	5.41	6.13	6.27	7.26	6.72	5.80
102	Nor Pac Ry prior lien 1st M 4s 1907.....	4.74	4.81	4.97	5.25	5.13	4.78	4.62	4.63	4.85	4.86	5.10	5.02	4.67
103	Nor & West Ry 1st cons M 4s 1906.....	4.06	4.18	4.30	4.45	4.23	4.06	4.13	4.04	4.13	4.08	4.24	4.15	4.01
104	Central RR of N J gen M 5s 1937.....	5.41	5.45	5.72	6.04	5.65	5.23	5.05	4.95	5.03	5.12	5.37	5.40	5.08
105	Hocking Valley 1st cons M 4½s 1999.....	4.67	4.65	5.14	5.17	4.88	4.69	4.55	4.52	4.63	4.58	4.78	4.70	4.52
108	Southern Pac 1st ref M 4s 1955.....	5.98	6.33	7.14	7.18	6.58	6.03	5.50	5.62	6.42	6.48	7.21	6.99	5.99
109	A T & S F Ry adj M 4s stamped 1995.....	4.68	4.71	4.93	5.09	4.97	4.67	4.61	4.55	4.67	4.67	5.03	4.96	4.63
110	Nor Pac Ry prior lien 1st M 4s 1907.....	5.11	5.27	5.48	5.94	5.31	4.98	5.05	5.04	5.29	5.22	5.64	5.22	4.81
118	Chic Burl & Quincy gen M 4s 1953.....	4.59	4.67	4.74	5.32	4.88	4.78	4.45	4.43	4.54	4.59	4.91	4.66	4.36
120	Nor Pac RR 1st lien & ref M 4s 2008.....	4.44	4.57	4.79	4.82	4.85	4.58	4.50	4.34	4.53	4.44	4.73	4.59	4.35
124	Canada So 1st & ref cons 5s 1962.....	6.23	6.10	6.35	6.54	6.36	5.90	5.50	5.39	5.65	5.74	6.20	5.87	5.31
126	Pennsylvania RR cons M 4½s 1960.....	4.29	4.36	4.58	4.71	4.50	4.28	4.30	4.23	4.37	4.38	4.42	4.30	4.22
131	Pennsylvania RR gen M 5s 1968.....	5.51	5.56	5.86	6.20	5.64	5.28	4.94	4.91	5.22	5.20	5.60	5.38	5.03
131	Pennsylvania RR gen M 5s 1968.....	5.56	5.48	6.04	6.06	5.66	5.31	5.08	5.02	5.14	5.13	5.49	5.22	5.02
133	St Louis SoWestern 1st M 4s 1989.....	6.66	6.98	7.38	7.72	7.06	6.48	6.15	5.80	6.31	6.64	7.50	6.89	5.90
134	Mo-Kansas-Texas Ry 1st M 4s 1990.....	5.11	5.00	5.27	5.69	5.28	4.70	4.65	4.83	5.32	5.11	5.63	5.42	4.92
135	Ches & Ohio Ry gen M 4½s 1997.....	4.42	4.54	4.73	5.00	4.51	4.40	4.37	4.37	4.49	4.44	4.67	4.56	4.41
136	Ches & Ohio RR cons M 4½s 1993.....	5.44	5.34	5.43	5.88	5.26	5.30	4.94	4.87	5.04	5.27	5.88	5.60	5.05
136	Ches & Ohio RR cons M 4½s 1993.....	6.24	6.16	6.45	6.70	5.90	5.31	4.98	4.95	5.27	5.34	5.76	5.72	5.12
138	Tex & Pac Ry 1st M 5s 2000.....	5.24	5.29	5.51	5.61	5.48	5.20	5.06	5.04	5.28	5.34	5.77	5.74	5.24
140	Canadian Pac Ry 4½ deb stock.....	6.15	7.27	7.62	7.45	6.40	5.99	6.04	6.06	6.71	6.38	6.98	6.75	5.87
143	Pitts Cin Chi & St L gen M 5s 1975.....	5.80	5.96	6.29	6.86	6.05	5.52	5.20	5.07	5.18	5.14	5.64	5.54	5.20
146	Eric RR cons prior lien 4s 1996.....	5.50	5.53	5.94	6.31	5.60	5.23	4.90	4.95	5.17	5.14	5.56	5.26	4.90
147	Ches & Ohio RR cons prior lien 4s 1981.....	5.45	5.47	5.94	6.31	5.60	5.23	4.90	4.95	5.17	5.14	5.56	5.26	4.90
147	Ches & Ohio RR cons prior lien 4s 1981.....	5.45	5.47	5.94	6.31	5.60	5.23	4.90	4.95	5.17	5.14	5.56	5.26	4.90
149	C & O (Rich & All Div) 1st 4s 1989.....	4.31	4.36	4.79	4.78	4.57	4.33	4.17	4.06	4.02	4.27	4.40	4.37	4.06
150	C C C & St L (St L Div) 1st 4s 1990.....	5.42	5.50	5.82	6.07	5.50	5.41	5.44	5.31	5.27	5.42	5.80	5.82	5.18

YIELDS OF RAILROAD BONDS
Jan. 1934-Jan. 1935

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361.....	5.37	4.95	4.80	4.76	4.73	4.72	4.75	4.93	5.09	4.88	4.87	4.80	4.75
71	West Shore RR 2d M 4s 2361.....	4.23	4.04	3.90	3.86	3.83	3.84	3.73	3.84	3.85	3.88	3.76	3.80	3.57
84	Atchafalaya & Santa Fe RR M 4s 1995.....	4.23	4.09	4.01	3.99	3.95	3.88	3.82	3.90	3.96	3.88	3.82	3.72	3.67
95	N Y Cent & Hudson River M 3½s 1997.....	4.34	4.14	4.08	3.99	3.85	3.73	3.81	3.95	4.01	3.91	3.82	3.72	3.65
102	Nor Pac Ry prior lien lg M 4s 1997.....	4.67	4.35	4.20	4.13	4.10	4.06	4.06	4.20	4.23	4.12	4.04	3.96	3.86
103	Norfolk & West Ry 1st cons M 4s 1996.....	4.01	3.93	3.91	3.85	3.78	3.75	3.73	3.76	3.83	3.79	3.68	3.62	3.55
104	Central RR of N J gen M 3s 1987.....	3.98	4.32	4.41	4.76	4.96	4.60	4.61	4.71	4.87	4.82	4.75	4.67	4.60
105	Central RR of N J 2d M 4s 1999.....	3.98	4.32	4.41	4.76	4.96	4.60	4.61	4.71	4.87	4.82	4.75	4.67	4.60
108	Southern Ry 1st M 4s 1935.....	5.99	5.05	4.90	4.92	4.83	4.88	4.86	5.14	5.37	5.05	4.89	4.74	4.53
109	A T & S Fe Ry adj M 4s stamped 1995.....	4.63	4.33	4.26	4.22	4.26	4.12	4.06	4.18	4.30	4.14	4.02	3.93	3.90
110	Northern Pac Ry gen lien 3s 2047.....	4.81	4.55	4.49	4.36	4.43	4.40	4.39	4.62	4.64	4.49	4.35	4.22	4.03
118	Chic Burl & Quincy gen M 4s 1958.....	4.36	4.14	4.04	3.90	3.84	3.79	3.77	3.78	3.95	3.80	3.71	3.61	3.51
120	Un Pac RR 1st lien & ref M 4s 2008.....	4.35	4.19	4.03	4.03	4.03	3.98	3.92	3.97	4.06	4.00	3.92	3.86	3.77
124	Canada So Ry 1st M 4s 1962.....	3.31	4.17	4.05	4.00	3.92	3.82	3.81	4.06	4.11	4.63	4.48	4.36	4.38
126	Pennsylvania RR cons M 4½s 1960.....	4.22	4.16	4.09	4.03	3.95	3.86	3.83	3.89	3.98	3.84	3.77	3.69	3.56
130	Pennsylvania RR gen M 4½s 1965.....	5.03	4.69	4.69	4.56	4.66	4.39	4.34	4.37	4.44	4.51	4.44	4.23	4.11
131	Pennsylvania RR gen M 5s 1968.....	5.02	4.79	4.73	4.66	4.62	4.62	4.50	4.48	4.61	4.65	4.50	4.42	4.32
135	Ches & Ohio Ry gen M 4½s 1992.....	4.41	4.24	4.19	4.17	4.12	4.06	4.03	4.05	4.09	4.07	3.99	3.91	3.81
136	Cleve Cin Chi & St L gen M 4s 1993.....	5.05	4.54	4.46	4.28	4.34	4.23	4.21	4.38	4.67	4.47	4.34	4.24	4.04
137	N Y Central RR consol M 4s 1998.....	5.12	4.69	4.59	4.57	4.60	4.62	4.61	4.79	4.96	4.88	4.81	4.71	4.66
138	Tex & Pac Ry 1st M 5s 2000.....	5.24	4.90	4.79	4.72	4.63	4.59	4.52	4.55	4.61	4.59	4.50	4.37	4.25
140	Canadian Pac Ry 4½s deb stock.....	5.87	5.25	5.11	4.99	4.88	4.84	4.84	4.84	5.03	5.22	5.00	4.87	4.69
143	Pitts Cen Chi & St L gen M 5s 1975.....	5.20	4.91	4.74	4.69	4.65	4.54	4.52	4.60	4.66	4.60	4.54	4.46	4.30
146	Erie RR cons prior lien 4s 1996.....	4.90	4.65	4.53	4.41	4.28	4.27	4.20	4.42	4.38	4.25	4.20	4.14	4.05
147	Pennsylvania RR gen M 4½s 1981.....	4.99	4.69	4.54	4.48	4.44	4.38	4.39	4.54	4.55	4.46	4.39	4.29	4.17
148	Chicago & Erie 1st 5s 1982.....	5.26	4.93	4.84	4.68	4.64	4.61	4.50	4.56	4.62	4.50	4.52	4.46	4.37
149	Chic & N Y Ry 1st 4½s 1989.....	5.18	4.86	4.78	4.68	4.64	4.61	4.50	4.56	4.62	4.50	4.52	4.46	4.37
150	C O & St L (St L Div) 1st 4s 1990.....	5.18	4.86	4.78	4.68	4.64	4.61	4.50	4.56	4.62	4.50	4.52	4.46	4.37

RAILROAD BOND YIELDS

A107

YIELDS OF RAILROAD BONDS
Jan. 1935-Jan. 1936

Ref. No.	Name of Bond	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.
70	West Shore RR 1st M 4s 2361	4.75	4.72	5.01	5.18	4.99	5.00	4.85	4.87	4.96	4.99	5.04	4.82	4.53
88	Sh & Mich So 1st M 3 1/2s 1907	3.57	3.50	3.52	3.52	3.50	3.46	3.46	3.51	3.53	3.55	3.55	3.61	3.45
94	Atch Top & Santa Fe gen M 4s 1905	3.67	3.62	3.63	3.64	3.64	3.62	3.58	3.64	3.63	3.67	3.66	3.61	3.54
95	N V Cent & Hudson River M 3 1/2s 1907	3.65	3.59	3.71	3.72	3.74	3.73	3.63	3.72	3.73	3.74	3.73	3.65	3.54
102	Nor Pac Ry prior lien lg M 4s 1907	3.86	3.82	3.85	3.88	3.87	3.83	3.79	3.90	3.91	3.92	3.91	3.85	3.76
103	Norfolk & West Ry 1st cons M 4s 1906	3.55	3.48	3.47	3.46	3.42	3.40	3.40	3.43	3.42	3.44	3.44	3.42	3.36
104	Central RR of N J gen M 5s 1987	4.60	4.59	4.59	4.59	4.57	4.56	4.56	4.56	4.56	4.56	4.56	4.56	4.56
105	Hocking Valley 1st gen M 4 1/2s 1909	4.00	3.99	4.00	4.00	3.97	3.97	3.86	3.81	3.82	3.83	3.80	3.80	3.78
108	Southern Pac 1st gen M 4s 1905	4.53	4.39	4.60	4.61	4.43	4.29	4.13	4.23	4.20	4.26	4.19	4.10	3.90
109	A T & S Fe Ry adj M 4s stamped 1905	3.90	3.82	3.80	3.86	3.87	3.83	3.79	3.85	3.88	3.87	3.85	3.82	3.74
110	Northern Pac Ry gen lien 3s 2047	4.03	4.04	4.11	4.19	4.09	4.01	4.06	4.18	4.19	4.26	4.31	4.12	3.96
118	Chic Burl & Quincy gen M 4s 1958	3.51	3.46	3.44	3.45	3.52	3.52	3.51	3.55	3.60	3.60	3.60	3.50	3.44
120	Un Pac RR 1st lien & ref M 4s 2008	3.77	3.73	3.72	3.74	3.74	3.72	3.72	3.75	3.76	3.80	3.79	3.73	3.66
124	Canada So 1st & ref cons 5s 1962	4.38	4.34	4.39	4.48	4.43	4.35	4.28	4.21	4.34	4.35	4.41	4.34	4.18
126	Pennsylvania RR cons M 4 1/2s 1960	3.56	3.46	3.47	3.50	3.50	3.50	3.41	3.49	3.50	3.49	3.43	3.40	3.36
130	Pennsylvania RR gen M 4 1/2s 1965	4.11	4.09	4.12	4.14	4.11	4.05	4.01	4.06	4.09	4.09	4.05	3.99	3.92
131	Pennsylvania RR gen M 5s 1968	4.32	4.21	4.31	4.34	4.26	4.22	4.15	4.23	4.29	4.29	4.22	4.16	4.05
135	Ches & Ohio Ry gen M 4 1/2s 1992	3.81	3.73	3.73	3.74	3.71	3.76	3.74	3.79	3.81	3.71	3.70	3.69	3.65
136	Cleve Cin Chi & St L gen M 4s 1993	4.04	4.01	4.23	4.36	4.21	4.23	4.12	4.14	4.18	4.23	4.33	4.17	4.07
137	N Y Central RR consol M 4s 1998	4.66	4.79	5.17	5.23	4.94	4.86	4.70	4.77	4.73	4.74	4.84	4.64	4.34
138	Tex & Pac Ry 1st M 5s 2000	4.25	4.17	4.24	4.34	4.29	4.26	4.22	4.32	4.33	4.34	4.32	4.27	4.18
140	Canadian Pac Ry 4% deb stock 1975	4.30	4.23	4.27	4.33	4.29	4.28	4.22	4.26	4.33	4.34	4.31	4.24	4.10
143	Titus Cons & St L gen M 4s 1906	4.07	4.01	3.99	4.06	4.01	4.01	3.95	4.04	4.08	4.08	4.14	4.08	3.96
147	Erle RR cons M 4 1/2s 1908	4.15	4.10	4.10	4.11	4.06	3.99	3.95	4.01	4.09	4.08	4.05	4.00	3.95
148	Chicago & Erie 1st 5s 1982	4.37	4.24	4.28	4.32	4.29	4.27	4.21	4.28	4.25	4.28	4.27	4.23	4.20
149	C & O (Rich & All Div) 1st 4s 1989	3.78	3.55	3.53	3.51	3.49	3.55	3.53	3.53	3.56	3.58	3.51	3.50	3.49
150	C C & St L (St L Div) 1st 4s 1990	4.35	4.26	4.45	4.37	4.29	4.26	4.32	4.22	4.34	4.51	4.48	4.36	4.10

TABLE 4

AMERICAN RAILROAD BOND YIELDS,
JANUARY INDEX NUMBERS

1. An unadjusted chain index number based on simple geometric averages of the yields each January.

2. An unadjusted chain index number based on simple arithmetic averages of the yields each January.

In both the index numbers (geometric and arithmetic), the chaining is backwards and forwards from January 1925. In each case the index number for January 1925 is the average (geometric or arithmetic) of the yields in January 1925 of the bonds used from January 1924 to January 1925.

Date	(1) Geometric Index	(2) Arithmetic Index
January 1857	% 9.517	% 9.644
" 1858	10.204	10.376
" 1859	8.671	8.776
" 1860	8.788	8.920
" 1861	8.662	8.781
" 1862	8.412	8.513
" 1863	6.136	6.189
" 1864	6.658	6.702
" 1865	6.867	6.908
" 1866	8.108	8.143
" 1867	7.786	7.822
" 1868	7.822	7.859
" 1869	7.992	8.036
" 1870	8.215	8.263
" 1871	7.849	7.890
" 1872	7.527	7.562
" 1873	7.624	7.658
" 1874	7.649	7.685
" 1875	7.213	7.255
" 1876	6.753	6.795
" 1877	6.564	6.607
" 1878	6.506	6.543
" 1879	6.157	6.188
" 1880	5.797	5.824
" 1881	5.169	5.194
" 1882	5.213	5.242
" 1883	5.182	5.205
" 1884	5.123	5.149
" 1885	5.049	5.076
" 1886	4.620	4.643
" 1887	4.543	4.564
" 1888	4.621	4.643
" 1889	4.473	4.499
" 1890	4.451	4.472

RAILROAD BOND YIELDS

A109

TABLE 4—(Concluded)

Date	(1) Geometric Index	(2) Arithmetic Index
January 1891	% 4.600	% 4.622
" 1892	4.557	4.577
" 1893	4.510	4.531
" 1894	4.525	4.547
" 1895	4.288	4.310
" 1896	4.308	4.331
" 1897	4.200	4.222
" 1898	3.976	3.996
" 1899	3.841	3.859
" 1900	3.903	3.923
" 1901	3.806	3.824
" 1902	3.795	3.810
" 1903	3.905	3.918
" 1904	4.023	4.035
" 1905	3.874	3.885
" 1906	3.902	3.912
" 1907	4.056	4.065
" 1908	4.302	4.316
" 1909	4.049	4.058
" 1910	4.108	4.116
" 1911	4.167	4.174
" 1912	4.179	4.187
" 1913	4.269	4.276
" 1914	4.442	4.451
" 1915	4.586	4.595
" 1916	4.468	4.476
" 1917	4.367	4.376
" 1918	5.202	5.215
" 1919	5.070	5.077
" 1920	5.506	5.517
" 1921	5.573	5.584
" 1922	5.002	5.011
" 1923	4.853	4.857
" 1924	4.945	4.949
" 1925	4.774	4.776
" 1926	4.643	4.645
" 1927	4.451	4.454
" 1928	4.184	4.187
" 1929	4.500	4.501
" 1930	4.503	4.504
" 1931	4.315	4.322
" 1932	5.591	5.637
" 1933	5.222	5.290
" 1934	4.944	4.997
" 1935	4.171	4.209
" 1936	4.008	4.047

TABLE 5

AMERICAN RAILROAD BOND YIELDS, SIX INDEX NUMBERS OF BEST 5
AND WORST 5 BONDS

In this table are six index numbers for the yields of American railroad bonds annually (each January). These six index numbers fall into two groups of three each; one group based on operations performed on the 'best five bonds' each year and the other group based on operations performed on the 'worst five bonds' each year.

The index number in column 1 was constructed in the following manner: Out of the total number of bonds whose yields were used in our monthly index numbers from January 1857 to January 1858 there were selected the five bonds having the lowest yields in January 1857. The average of the yields of this particular group of five bonds was then calculated for January 1857 and the average of the yields of the same five bonds calculated for January 1858. The percentage change in this average from January 1857 to January 1858 was then taken as the percentage change in the index number of column 1 from January 1857 to January 1858. For the next year the five bonds having the lowest yields in January 1858 were chosen and the same procedure repeated. Such annual percentage changes were then 'chained' to make the index in column 1.

Column 2 was constructed as follows: Out of the total number of bonds whose yields were used in our monthly index numbers for the period January 1857 to January 1858 there were selected the five bonds having the lowest yields in January 1858. The average of the yields of this particular group of five bonds was then calculated for January 1857 and the average of the yields of the same group calculated for January 1858. The percentage change in this average was then taken as the percentage change in the index number of column 2 from January 1857 to January 1858. Succeeding years were calculated in the same manner. Annual percentage changes were then 'chained' to make the index in column 2.

Column 3 was constructed by selecting from the total number of bonds used in the monthly index numbers from January 1857 to January 1858 the five bonds having the lowest yields in January 1857 and also the five bonds having the lowest yields in January 1858 without any consideration as to whether these two groups (of five bonds each) were or were not composed of the same five bonds. The percentage that the average yield of the January 1858 group of five bonds was of the average yield of the January 1857 group of five bonds was then taken as the percentage that the January 1858 index figure in column 3 was of the January 1857 index figure in the same column. Percentages were chained together as in columns 1 and 2.

The construction of columns 4, 5 and 6 can be easily understood from the preceding explanation, remembering simply that in each case the bonds chosen were those having the *highest* yields instead of the *lowest* yields.

RAILROAD BOND YIELDS

A111

Each of the six index numbers was 'chained' backward from January 1936. The three index numbers based on the yields of the 'best five bonds' show, therefore, the same yield in January 1936 as the average of the yields of the best five bonds in January 1936. Similarly, the three index numbers based on the yields of the 'worst five bonds' show in January 1936 the same yield as the average of the yields of the worst five bonds in that month.

All averaging was geometric.

Six index numbers, three based on the 5 bonds each year having the lowest yields and three based on the 5 bonds each year having the highest yields.

	Best 5 Bonds			Worst 5 Bonds		
	(1) Earlier January	(2) Later January	(3) Either January	(4) Earlier January	(5) Later January	(6) Either January
Jan. 1857	4.35	13.65	7.63	20.33	6.02	11.15
" 1858	4.59	14.00	7.98	22.36	6.64	12.28
" 1859	4.15	12.31	7.14	17.90	5.52	9.99
" 1860	4.16	11.98	6.94	18.55	5.82	10.38
" 1861	4.12	11.78	6.86	17.87	5.72	10.11
" 1862	4.11	11.70	6.82	17.19	5.59	9.78
" 1863	3.11	8.78	5.12	12.19	4.00	7.00
" 1864	3.50	9.79	5.73	12.72	4.21	7.36
" 1865	3.58	9.82	5.76	12.62	4.38	7.43
" 1866	4.51	11.64	7.13	14.07	5.15	8.53
" 1867	4.36	11.03	6.83	13.49	5.04	8.29
" 1868	4.42	11.10	6.92	13.53	5.05	8.31
" 1869	4.48	11.09	6.95	13.85	5.27	8.59
" 1870	4.57	11.18	7.05	14.05	5.41	8.80
" 1871	4.51	10.66	6.90	13.10	5.21	8.35
" 1872	4.43	10.07	6.66	12.29	5.10	8.02
" 1873	4.52	10.26	6.79	12.46	5.17	8.13
" 1874	4.50	10.11	6.71	12.55	5.21	8.19
" 1875	4.26	9.16	6.22	12.13	5.03	7.91
" 1876	3.97	8.46	5.78	11.32	4.70	7.39
" 1877	3.94	7.90	5.52	10.92	4.53	7.13
" 1878	3.98	7.90	5.55	10.65	4.47	6.98
" 1879	3.82	7.51	5.30	9.89	4.19	6.50
" 1880	3.62	7.11	5.02	9.22	3.97	6.12
" 1881	3.23	6.30	4.48	8.23	3.59	5.49
" 1882	3.26	6.22	4.45	8.41	3.69	5.62
" 1883	3.34	6.24	4.53	8.06	3.59	5.40
" 1884	3.28	6.06	4.41	7.99	3.57	5.36
" 1885	3.24	5.80	4.29	7.85	3.53	5.28
" 1886	3.01	5.31	3.94	7.03	3.24	4.78
" 1887	2.99	5.27	3.92	6.82	3.17	4.65
" 1888	3.06	5.40	4.01	6.96	3.27	4.78

TABLE 5—(Concluded)

	Best 5 Bonds			Worst 5 Bonds		
	(1) Earlier January	(2) Later January	(3) Either January	(4) Earlier January	(5) Later January	(6) Either January
Jan. 1889	2.92	5.06	3.82	6.96	3.28	4.79
" 1890	3.00	5.05	3.87	6.68	3.14	4.59
" 1891	3.16	5.25	4.05	6.91	3.31	4.80
" 1892	3.13	5.13	3.98	6.64	3.20	4.62
" 1893	3.10	5.08	3.94	6.63	3.21	4.62
" 1894	3.11	5.04	3.94	6.66	3.24	4.65
" 1895	2.96	4.75	3.74	6.27	3.12	4.41
" 1896	2.94	4.70	3.71	6.26	3.19	4.44
" 1897	2.90	4.60	3.64	6.06	3.11	4.31
" 1898	2.79	4.32	3.46	5.77	2.97	4.11
" 1899	2.72	4.06	3.29	5.51	2.84	3.93
" 1900	2.74	4.05	3.29	5.53	2.90	3.99
" 1901	2.72	4.02	3.28	5.31	2.80	3.83
" 1902	2.74	3.98	3.28	5.26	2.79	3.81
" 1903	2.91	4.15	3.47	5.35	2.84	3.89
" 1904	3.07	4.35	3.64	5.51	2.95	4.00
" 1905	3.02	4.23	3.57	5.20	2.82	3.81
" 1906	3.09	4.26	3.61	5.21	2.86	3.84
" 1907	3.23	4.45	3.77	5.36	2.96	3.97
" 1908	3.40	4.69	3.97	5.69	3.32	4.35
" 1909	3.27	4.50	3.82	5.14	3.02	3.95
" 1910	3.35	4.58	3.91	5.16	3.06	3.98
" 1911	3.40	4.65	3.97	5.18	3.14	4.01
" 1912	3.42	4.66	3.99	5.18	3.15	4.03
" 1913	3.49	4.75	4.07	5.27	3.22	4.10
" 1914	3.62	4.86	4.20	5.48	3.40	4.27
" 1915	3.69	4.93	4.27	5.67	3.52	4.42
" 1916	3.62	4.80	4.18	5.49	3.48	4.30
" 1917	3.55	4.70	4.09	5.45	3.48	4.29
" 1918	4.24	5.43	4.80	6.52	4.38	5.26
" 1919	4.31	5.40	4.81	5.96	4.11	4.88
" 1920	4.63	5.69	5.10	6.67	4.60	5.47
" 1921	4.75	5.72	5.19	6.70	4.66	5.51
" 1922	4.32	5.10	4.66	5.90	4.25	4.95
" 1923	4.27	5.00	4.59	5.54	4.04	4.65
" 1924	4.35	5.09	4.68	5.56	4.07	4.68
" 1925	4.31	4.98	4.62	5.30	3.90	4.47
" 1926	4.25	4.85	4.53	5.11	3.79	4.34
" 1927	4.12	4.69	4.39	4.87	3.60	4.13
" 1928	3.91	4.42	4.15	4.55	3.37	3.85
" 1929	4.22	4.72	4.46	4.86	3.60	4.12
" 1930	4.22	4.68	4.45	4.90	3.66	4.16
" 1931	3.98	4.39	4.18	4.82	3.69	4.16
" 1932	4.62	5.08	4.85	6.90	5.57	6.17
" 1933	4.14	4.38	4.25	6.41	5.63	6.01
" 1934	4.07	4.26	4.15	5.78	5.44	5.56
" 1935	3.56	3.59	3.57	4.72	4.61	4.65
" 1936	3.42	3.42	3.42	4.51	4.51	4.51

TABLE 6

INDEX NUMBERS OF THE YIELDS OF AMERICAN RAILROAD BONDS
BASED ON SIGMA EQUATIONS

(Quarterly January 1857—January 1879;

Monthly January 1879—January 1936)

- Col. 1. The Sigma index number whose yield in January 1925 was 4.50 per cent (4.4998%).
- Col. 2. A cumulation of the logarithms of the slopes of the lines fitted by Sigma ratios $\frac{\sigma_y}{\sigma_x}$.
- Col. 3. Logarithms of the Sigma index number whose yield in January 1925 was 5.00 per cent (5.0009%).
- Col. 4. Logarithms of the Sigma index number whose yield in January 1925 was 4.50 per cent (4.4998%).
- Col. 5. A cyclical curve (see Appendix D) fitted to the logarithms of the 4.50 Sigma index (Col. 4).

The figures in column 3 are not introduced in this table because they have any great significance of their own. They are introduced primarily because, if they are used with the figures in column 4, any sigma index whatever may be quickly obtained. The relation between the figures in column 3 and those in column 4 is such that any other sigma index falls, at each date, the same proportion of the distance between the figures of column 3 and those of column 4. For example, if for each month we take a figure which is half way between the figure in column 3 and the figure in column 4, we obtain a new sigma index.

TABLE 6

Date	1 Sigma "4.50" in Jan. 1925	2 Cum. Log. of sigma slopes	3 Log. "5.00"	4 Log. "4.50"	5 Cyclical curve to Log. "4.50"
1857					
J	6.745		1.24366	.82900	
A	6.745	I.99551	1.23938	.82899	
J	6.868	.03825	1.28966	.83683	
O	7.972	.09254	1.41591	.90159	
1858					
J	7.006	.07342	1.33762	.84545	
A	6.591	.01258	1.24678	.81894	
J	6.385	.02982	1.25134	.80514	
O	6.310	I.96854	1.18749	.80001	
1859					
J	6.258	I.95204	1.16947	.79644	
A	6.183	I.96828	1.17843	.79119	
J	6.409	I.98462	1.20891	.80682	
O	6.278	I.98401	1.19931	.79779	
1860					
J	6.139	.03437	1.23898	.78809	
A	6.137	I.97054	1.17722	.78795	
J	5.923	I.94691	1.14115	.77250	
O	5.898	I.97022	1.15972	.77074	
1861					
J	6.135	.00118	1.20556	.78784	
A	6.104	I.98600	1.18896	.78560	
J	6.148	.00429	1.20947	.78875	
O	6.346	I.99099	1.21056	.80252	
1862					
J	6.099	I.94065	1.14865	.78528	
A	5.962	I.89995	1.10627	.77539	
J	5.627	I.85798	1.05067	.75027	
O	5.089	I.86484	1.01177	.70660	
1863					
J	4.609	I.85633	.96286	.66361	
A	4.772	I.82670	.95819	.67867	
J	4.825	I.83981	.97159	.68352	
O	4.942	I.75906	.93309	.69390	
1864					
J	5.222	I.74356	.94862	.71781	
A	4.774	I.76412	.92086	.67885	
J	4.065	I.92929	.96304	.60905	
O	4.947	I.82602	.97341	.69433	
1865					
J	5.402	I.73380	.95827	.73259	
A	5.985	I.70119	.98642	.77706	
J	6.045	I.72200	1.00103	.78139	
O	6.344	I.63154	.98072	.80238	

RAILROAD BOND YIELDS

A115

TABLE 6 (Continued)

Date	1 Sigma "4.50" in Jan. 1925	2 Cum. Log. of sigma slopes	3 Log. "5.00"	4 Log. "4.50"	5 Cyclical curve to Log. "4.50"
1866					
J	6.649	I. 57803	.98041	.82274	
A	6.548	I. 65817	1.00575	.81613	
J	6.370	I. 61284	.97498	.80416	
O	6.164	I. 65649	.97876	.78987	
1867					
J	6.342	I. 60403	.96962	.80222	
A	6.344	I. 64366	.98577	.80238	
J	6.204	I. 66270	.98429	.79268	
O	6.283	I. 65879	.98809	.79819	
1868					
J	6.359	I. 61149	.97366	.80336	
A	6.243	I. 64012	.97731	.79541	
J	6.245	I. 59944	.96117	.79553	
O	6.281	I. 65740	.98735	.79806	
1869					
J	6.382	I. 67317	1.00127	.80499	
A	6.542	I. 62815	.99264	.81569	
J	6.460	I. 65201	.99720	.81025	
O	6.556	I. 67570	1.01410	.81667	
1870					
J	6.519	I. 69528	1.02068	.81415	
A	6.395	I. 62365	.98097	.80584	
J	6.377	I. 55900	.95549	.80458	
O	6.374	I. 62055	.97831	.80443	
1871					
J	6.383	I. 60991	.97470	.80502	
A	6.439	I. 52420	.94808	.80879	
J	6.398	I. 50781	.94017	.80604	
O	6.280	I. 62558	.97384	.79793	
1872					
J	6.159	I. 58512	.94976	.78950	
A	6.295	I. 51999	.93694	.79899	
J	6.028	I. 61239	.95090	.78025	
O	6.214	I. 60527	.96122	.79335	
1873					
J	6.249	I. 57862	.95367	.79579	
A	6.222	I. 60949	.96338	.79387	
J	6.152	I. 59581	.95330	.78904	
O	6.391	I. 70236	1.01553	.80560	
1874					
J	6.180	I. 62845	.96808	.79100	
A	5.984	I. 67444	.97388	.77703	
J	5.845	I. 74453	.99809	.76676	
O	5.716	I. 76504	.99963	.75710	

TABLE 6 (Continued)

Date	1 Sigma "4.50" in Jan. 1925	2 Cum. Log. of sigma slopes	3 Log. "5.00"	4 Log. "4.50"	5 Cyclical curve to Log. "4.50"
1875					
J	5.627	I.73536	.97679	.75029	
A	5.414	I.77829	.98355	.73351	
J	5.414	I.75095	.96831	.73353	
O	5.363	I.76477	.97179	.72942	
1876					
J	5.247	I.74612	.95209	.71991	
A	5.252	I.70881	.93339	.72032	
J	5.094	I.75308	.94302	.70708	
O	5.254	I.69445	.92666	.72051	
1877					
J	5.050	I.77163	.94950	.70327	
A	5.349	I.67745	.92654	.72831	
J	5.153	I.69357	.91785	.71212	
O	5.204	I.70061	.92534	.71626	
1878					
J	5.107	I.71931	.92653	.70824	
A	5.174	I.67905	.91273	.71377	
J	5.037	I.69691	.90955	.70224	
O	5.025	I.70359	.91161	.70108	
1879					
J	4.933	I.66360	.88507	.69307	.6958
F	4.883	I.60920	.85810	.68870	.6925
M	4.947	I.61950	.86785	.69438	.6893
A	4.947	I.61940	.86774	.69431	.6861
M	4.805	I.63732	.86242	.68169	.6832
J	4.731	I.65443	.86293	.67493	.6807
J	4.670	I.66654	.86260	.66929	.6785
A	4.677	I.65790	.85947	.66997	.6767
S	4.791	I.63975	.86217	.68043	.6753
O	4.757	I.65370	.86495	.67727	.6741
N	4.717	I.66571	.86658	.67364	.6729
D	4.710	I.64739	.85798	.67301	.6717
1880					
J	4.673	I.64438	.85331	.66962	.6702
F	4.635	I.63266	.84489	.66609	.6682
M	4.622	I.63263	.84361	.66481	.6658
A	4.657	I.61955	.84157	.66809	.6628
M	4.652	I.61728	.84019	.66761	.6594
J	4.551	I.65277	.84542	.65815	.6555
J	4.419	I.68509	.84701	.64526	.6513
A	4.391	I.67441	.83945	.64261	.6468
S	4.387	I.66101	.83305	.64219	.6421
O	4.349	I.65940	.82856	.63841	.6373
N	4.255	I.65577	.81749	.62891	.6327
D	4.183	I.65911	.81153	.62150	.6283

RAILROAD BOND YIELDS

A117

TABLE 6 (Continued)

Date	1 Sigma "4.50" in Jan. 1925	2 Cum. Log. of sigma slopes	3 Log. "5.00"	4 Log. "4.50"	5 Cyclical curve to Log. "4.50"
1881					
J	4.160	1.64866	.80465	.61914	.6242
F	4.258	1.61812	.80214	.62923	.6208
M	4.276	1.63296	.80994	.63101	.6179
A	4.224	1.65322	.81314	.62567	.6156
M	4.067	1.67834	.80789	.60926	.6140
J	4.019	1.66942	.79866	.60407	.6129
J	3.988	1.68651	.80319	.60078	.6122
A	4.019	1.68698	.80671	.60408	.6119
S	4.138	1.66277	.80844	.61679	.6117
O	4.170	1.66867	.81435	.62009	.6118
N	4.109	1.68826	.81693	.61371	.6121
D	4.119	1.69474	.82102	.61474	.6126
1882					
J	4.107	1.69759	.82116	.61352	.6132
F	4.098	1.71308	.82777	.61259	.6139
M	4.147	1.69910	.82606	.61770	.6146
A	4.130	1.68515	.81770	.61592	.6155
M	4.114	1.68064	.81395	.61426	.6163
J	4.148	1.66407	.81004	.61782	.6170
J	4.096	1.68153	.81250	.61240	.6178
A	4.132	1.67788	.81462	.61620	.6187
S	4.184	1.65928	.81175	.62164	.6198
O	4.157	1.66712	.81238	.61881	.6211
N	4.206	1.65174	.81069	.62385	.6227
D	4.265	1.61689	.80236	.62993	.6246
1883					
J	4.233	1.61496	.79824	.62658	.6266
F	4.219	1.63868	.80655	.62525	.6287
M	4.261	1.62286	.80434	.62952	.6306
A	4.283	1.59982	.79744	.63166	.6321
M	4.278	1.59961	.79690	.63120	.6332
J	4.278	1.59751	.79616	.63126	.6337
J	4.285	1.58999	.79412	.63205	.6336
A	4.334	1.58078	.79559	.63692	.6331
S	4.364	1.56289	.79220	.63993	.6322
O	4.329	1.57913	.79444	.63637	.6312
N	4.322	1.56372	.78824	.63568	.6301
D	4.263	1.58614	.79033	.62969	.6290
1884					
J	4.154	1.63299	.79741	.61847	.6282
F	4.184	1.58949	.78348	.62159	.6275
M	4.184	1.56771	.77554	.62157	.6271
A	4.173	1.55843	.77108	.62037	.6267
M	4.217	1.57972	.78327	.62498	.6265
J	4.250	1.62031	.80214	.62835	.6261
J	4.242	1.63026	.80545	.62763	.6255
A	4.237	1.59541	.79114	.62704	.6245
S	4.234	1.60159	.79316	.62670	.6231
O	4.209	1.61289	.79501	.62417	.6210
N	4.202	1.61894	.79674	.62350	.6182
D	4.196	1.60126	.78915	.62282	.6148

TABLE 6 (Continued)

Date	1 Sigma "4.50" in Jan. 1925	2 Cum. Log. of sigma slopes	3 Log. "5.00"	4 Log. "4.50"	5 Cyclical curve to Log. "4.50"
1885					
J	4.059	I. 65353	.79603	.60842	.6108
F	4.007	I. 66278	.79442	.60277	.6064
M	3.957	I. 67031	.79232	.59733	.6018
A	3.938	I. 67408	.79199	.59529	.5972
M	3.889	I. 69234	.79494	.58980	.5928
J	3.847	I. 68920	.78880	.58513	.5888
J	3.826	I. 68513	.78445	.58268	.5852
A	3.817	I. 68497	.78338	.58169	.5821
S	3.807	I. 68329	.78150	.58058	.5795
O	3.798	I. 66792	.77351	.57958	.5773
N	3.800	I. 65193	.76664	.57973	.5755
D	3.776	I. 65363	.76465	.57700	.5739
1886					
J	3.757	I. 62669	.75112	.57475	.5726
F	3.706	I. 61610	.74106	.56894	.5715
M	3.706	I. 60719	.73756	.56894	.5707
A	3.727	I. 59990	.73718	.57136	.5700
M	3.719	I. 60328	.73749	.57038	.5696
J	3.717	I. 58310	.72974	.57022	.5694
J	3.658	I. 60452	.73087	.56328	.5694
A	3.657	I. 61315	.73405	.56310	.5696
S	3.745	I. 59044	.73568	.57344	.5701
O	3.747	I. 58972	.73564	.57367	.5708
N	3.763	I. 57745	.73296	.57550	.5718
D	3.789	I. 57629	.73560	.57856	.5729
1887					
J	3.746	I. 59105	.73605	.57358	.5743
F	3.746	I. 59722	.73832	.57353	.5757
M	3.762	I. 59703	.74018	.57546	.5773
A	3.794	I. 59738	.73725	.57909	.5788
M	3.787	I. 57507	.73492	.57832	.5802
J	3.797	I. 57204	.73496	.57945	.5815
J	3.762	I. 60871	.74459	.57537	.5826
A	3.805	I. 60193	.74700	.58041	.5834
S	3.902	I. 58631	.75195	.59124	.5838
O	3.920	I. 59226	.75617	.59325	.5839
N	3.868	I. 60262	.75431	.58746	.5836
D	3.801	I. 63486	.75965	.57994	.5828
1888					
J	3.795	I. 60210	.74581	.57915	.5815
F	3.758	I. 61030	.74483	.57500	.5797
M	3.781	I. 60789	.74649	.57760	.5774
A	3.782	I. 60934	.74713	.57767	.5746
M	3.752	I. 61754	.74690	.57422	.5715
J	3.683	I. 64733	.75111	.56616	.5679
J	3.617	I. 66105	.74923	.55835	.5641
A	3.616	I. 65876	.74809	.55821	.5601
S	3.595	I. 68788	.75871	.55587	.5561
O	3.578	I. 70148	.76324	.55373	.5523
N	3.572	I. 69716	.76034	.55290	.5487
D	3.586	I. 68385	.75576	.55459	.5456

RAILROAD BOND YIELDS

A119

TABLE 6 (Continued)

Date	1 Sigma "4.50" in Jan. 1925	2 Cum. Log. of sigma slopes	3 Log. "5.00"	4 Log. "4.50"	5 Cyclical curve to Log. "4.50"
1889					
J	3.513	I. 70187	.75537	.54567	.5431
F	3.458	I. 70963	.75234	.53886	.5412
M	3.402	I. 74482	.76317	.53168	.5400
A	3.455	I. 71246	.75331	.53843	.5395
M	3.428	I. 70490	.74616	.53500	.5398
J	3.424	I. 68524	.73630	.53448	.5406
J	3.483	I. 66071	.73273	.54199	.5420
A	3.522	I. 64154	.72933	.54683	.5438
S	3.547	I. 62818	.72680	.54983	.5459
O	3.570	I. 63863	.73399	.55270	.5483
N	3.568	I. 65887	.74236	.55243	.5507
D	3.595	I. 64986	.74173	.55570	.5532
1890					
J	3.617	I. 62620	.73458	.55841	.5555
F	3.600	I. 63784	.73721	.55626	.5577
M	3.613	I. 63993	.73973	.55791	.5596
A	3.628	I. 63135	.73793	.55966	.5612
M	3.617	I. 63773	.73921	.55830	.5626
J	3.654	I. 62312	.73776	.56284	.5638
J	3.673	I. 61835	.73803	.56502	.5651
A	3.688	I. 62853	.74391	.56680	.5664
S	3.699	I. 63451	.74770	.56813	.5679
O	3.739	I. 62414	.74803	.57270	.5696
N	3.743	I. 64964	.75911	.57317	.5715
D	3.781	I. 65331	.76513	.57762	.5737
1891					
J	3.742	I. 62430	.74848	.57309	.5759
F	3.757	I. 61382	.74598	.57477	.5782
M	3.763	I. 63806	.75650	.57546	.5804
A	3.798	I. 62375	.75472	.57955	.5824
M	3.819	I. 62902	.75920	.58189	.5841
J	3.873	I. 62666	.76432	.58798	.5855
J	3.874	I. 62258	.76290	.58821	.5864
A	3.891	I. 61289	.76091	.59007	.5868
S	3.872	I. 61183	.75828	.58786	.5867
O	3.884	I. 57977	.74763	.58933	.5861
N	3.872	I. 56983	.74261	.58789	.5851
D	3.862	I. 55010	.73461	.58677	.5836
1892					
J	3.776	I. 57998	.73536	.57698	.5818
F	3.761	I. 57254	.73102	.57534	.5799
M	3.775	I. 56709	.73063	.57689	.5779
A	3.764	I. 56308	.72797	.57565	.5760
M	3.758	I. 55281	.72364	.57488	.5744
J	3.728	I. 56369	.72403	.57149	.5729
J	3.713	I. 56626	.72319	.56975	.5718
A	3.715	I. 56968	.72461	.56995	.5710
S	3.737	I. 58000	.73087	.57250	.5707
O	3.739	I. 57707	.73015	.57284	.5708
N	3.765	I. 56447	.72862	.57581	.5713
D	3.768	I. 57303	.73198	.57613	.5722

TABLE 6 (Continued)

Date	1 Sigma "4.50" in Jan. 1925	2 Cum. Log. of sigma slopes	3 Log. "5.00"	4 Log. "4.50"	5 Cyclical curve to Log. "4.50"
1893					
J	3.749	I.57182	.72931	.57390	.5734
F	3.740	I.55794	.72338	.57285	.5749
M	3.743	I.57802	.73083	.57318	.5766
A	3.740	I.58159	.73185	.57289	.5782
M	3.749	I.60543	.74181	.57389	.5797
J	3.785	I.62073	.75207	.57813	.5809
J	3.830	I.66581	.77621	.58325	.5818
A	3.865	I.69460	.79330	.58710	.5821
S	3.857	I.63559	.76625	.58625	.5819
O	3.865	I.60024	.75307	.58714	.5811
N	3.826	I.57113	.73785	.58268	.5797
D	3.798	I.55056	.72757	.57957	.5776
1894					
J	3.730	I.59308	.73487	.57165	.5750
F	3.706	I.57958	.72709	.56887	.5719
M	3.698	I.56142	.71970	.56796	.5684
A	3.627	I.58179	.71861	.55959	.5649
M	3.612	I.59561	.72188	.55771	.5615
J	3.621	I.59290	.72192	.55878	.5584
J	3.616	I.60546	.72614	.55821	.5559
A	3.591	I.60820	.72415	.55516	.5538
S	3.571	I.60479	.72048	.55281	.5522
O	3.554	I.59405	.71431	.55074	.5510
N	3.512	I.60443	.71313	.54559	.5501
D	3.507	I.60775	.71376	.54494	.5492
1895					
J	3.520	I.60316	.71359	.54654	.5483
F	3.553	I.60430	.71808	.55059	.5472
M	3.561	I.60715	.72018	.55159	.5461
A	3.566	I.60744	.72092	.55222	.5448
M	3.512	I.61337	.71651	.54549	.5435
J	3.476	I.60070	.70724	.54113	.5421
J	3.477	I.58287	.70066	.54124	.5408
A	3.411	I.59950	.69854	.53290	.5395
S	3.427	I.59314	.69810	.53486	.5385
O	3.450	I.58402	.69763	.53778	.5378
N	3.470	I.58037	.69885	.54035	.5376
D	3.430	I.64060	.71738	.53530	.5378
1896					
J	3.478	I.64093	.72354	.54132	.5386
F	3.458	I.62969	.71641	.53885	.5399
M	3.489	I.61288	.71352	.54270	.5416
A	3.501	I.60270	.71108	.54422	.5434
M	3.487	I.60036	.70847	.54250	.5450
J	3.451	I.61812	.71081	.53791	.5464
J	3.484	I.64607	.72650	.54211	.5471
A	3.585	I.68164	.75462	.55449	.5472
S	3.578	I.65017	.73986	.55372	.5465
O	3.543	I.65041	.73567	.54942	.5451
N	3.512	I.61675	.71790	.54555	.5430
D	3.487	I.60537	.71041	.54251	.5402

RAILROAD BOND YIELDS

A121

TABLE 6 (Continued)

Date	1 Sigma "4.50" in Jan. 1925	2 Cum. Log. of sigma slopes	3 Log. "5.00"	4 Log. "4.50"	5 Cyclical curve to Log. "4.50"
1897					
J	3.429	I. 61534	.70704	.53525	.5378
F	3.392	I. 62527	.70620	.53043	.5341
M	3.367	I. 62493	.70292	.52729	.5303
A	3.343	I. 63263	.70296	.52418	.5264
M	3.330	I. 63302	.70132	.52239	.5229
J	3.289	I. 64127	.69937	.51701	.5189
J	3.264	I. 63763	.69459	.51375	.5165
A	3.298	I. 62598	.69439	.51834	.5149
S	3.265	I. 65377	.70161	.51392	.5142
O	3.285	I. 64162	.69908	.51657	.5146
N	3.293	I. 62560	.69348	.51758	.5152
D	3.249	I. 62660	.68809	.51178	.5164
1898					
J	3.253	I. 61051	.68222	.51232	.5179
F	3.260	I. 60802	.68214	.51322	.5195
M	3.314	I. 62285	.69513	.52034	.5208
A	3.378	I. 63236	.70724	.52858	.5217
M	3.402	I. 59100	.69412	.53169	.5220
J	3.353	I. 58966	.68737	.52544	.5217
J	3.265	I. 62409	.68918	.51389	.5205
A	3.285	I. 59101	.67904	.51661	.5186
S	3.310	I. 58359	.67952	.51983	.5160
O	3.285	I. 58201	.67574	.51664	.5129
N	3.235	I. 59560	.67406	.50990	.5094
D	3.198	I. 60005	.67073	.50488	.5059
1899					
J	3.150	I. 60510	.66613	.49834	.5026
F	3.158	I. 60261	.66621	.49938	.4996
M	3.150	I. 60973	.66785	.49826	.4973
A	3.113	I. 61296	.66402	.49316	.4957
M	3.095	I. 60553	.65866	.49070	.4948
J	3.095	I. 59959	.65634	.49067	.4945
J	3.110	I. 60014	.65864	.49275	.4947
A	3.128	I. 60008	.66112	.49526	.4953
S	3.148	I. 60701	.66656	.49803	.4961
O	3.176	I. 60804	.67086	.50193	.4971
N	3.196	I. 60657	.67294	.50458	.4980
D	3.177	I. 64488	.68584	.50195	.4990
1900					
J	3.174	I. 62550	.67748	.50162	.4997
F	3.156	I. 61825	.67215	.49920	.5004
M	3.143	I. 62001	.67099	.49734	.5008
A	3.141	I. 60938	.66655	.49709	.5010
M	3.148	I. 62285	.67291	.49812	.5010
J	3.154	I. 62615	.67503	.49890	.5008
J	3.164	I. 61708	.67283	.50034	.5006
A	3.172	I. 61082	.67146	.50145	.5004
S	3.179	I. 60683	.67077	.50231	.5003
O	3.200	I. 59044	.66746	.50524	.5003
N	3.189	I. 58193	.66283	.50375	.5004
D	3.170	I. 57612	.65797	.50101	.5007

TABLE 6 (Continued)

Date	1 Sigma "4.50" in Jan. 1925	2 Cum. Log. of sigma slopes	3 Log. "5.00"	4 Log. "4.50"	5 Cyclical curve to Log. "4.50"
1901					
J	3.166	I.56987	.65526	.50054	.5011
F	3.143	I.57452	.65383	.49745	.5015
M	3.149	I.56808	.65232	.49824	.5018
A	3.158	I.56539	.65254	.49941	.5021
M	3.179	I.56645	.65577	.50226	.5023
J	3.179	I.55744	.65269	.50234	.5024
J	3.200	I.55236	.65375	.50515	.5025
A	3.202	I.56066	.65683	.50536	.5025
S	3.196	I.56906	.65900	.50457	.5026
O	3.206	I.55763	.65644	.50602	.5027
N	3.190	I.55133	.65206	.50381	.5029
D	3.189	I.55170	.65207	.50369	.5031
1902					
J	3.185	I.54536	.64936	.50314	.5037
F	3.168	I.55282	.64959	.50082	.5043
M	3.179	I.54216	.64742	.50227	.5052
A	3.179	I.53686	.64565	.50226	.5063
M	3.208	I.52136	.64455	.50619	.5077
J	3.243	I.50027	.64274	.51093	.5095
J	3.270	I.48748	.64254	.51455	.5116
A	3.292	I.47834	.64274	.51742	.5141
S	3.306	I.47601	.64397	.51932	.5169
O	3.327	I.48492	.64923	.52201	.5200
N	3.344	I.47480	.64857	.52427	.5234
D	3.347	I.49045	.65353	.52467	.5268
1903					
J	3.363	I.46779	.64896	.52665	.5303
F	3.388	I.45454	.64863	.53000	.5335
M	3.434	I.44832	.65272	.53578	.5366
A	3.487	I.42346	.65284	.54240	.5394
M	3.455	I.43963	.65303	.53840	.5419
J	3.463	I.45831	.65917	.53950	.5441
J	3.551	I.41181	.65779	.55027	.5459
A	3.622	I.37617	.65803	.55899	.5474
S	3.595	I.40814	.66228	.55567	.5486
O	3.531	I.43419	.66112	.54792	.5494
N	3.493	I.44386	.65892	.54317	.5499
D	3.508	I.43446	.65835	.54507	.5500
1904					
J	3.510	I.42173	.65527	.54527	.5498
F	3.519	I.42087	.65622	.54643	.5492
M	3.560	I.38975	.65358	.55139	.5485
A	3.551	I.37433	.64899	.55037	.5476
M	3.557	I.35281	.64494	.55108	.5468
J	3.533	I.35401	.64231	.54819	.5459
J	3.503	I.35071	.63778	.54438	.5450
A	3.482	I.36201	.63767	.54181	.5441
S	3.483	I.36442	.63841	.54201	.5431
O	3.491	I.34741	.63555	.54286	.5422
N	3.491	I.33523	.63310	.54297	.5411
D	3.476	I.34079	.63236	.54107	.5402

TABLE 6 (Continued)

Date	1 Sigma "4.50" in Jan. 1925	2 Cum. Log. of sigma slopes	3 Log. "5.00"	4 Log. "4.50"	5 Cyclical curve to Log. "4.50"
1905					
J	3.438	1.35499	.63067	.53634	.5393
F	3.443	1.33941	.62790	.53690	.5385
M	3.452	1.34153	.62960	.53814	.5378
A	3.455	1.34467	.63064	.53853	.5374
M	3.461	1.34481	.63133	.53919	.5373
J	3.450	1.35166	.63136	.53776	.5374
J	3.445	1.34474	.62934	.53722	.5378
A	3.451	1.34124	.62938	.53799	.5384
S	3.457	1.33465	.62873	.53872	.5393
O	3.466	1.32579	.62797	.53979	.5404
N	3.491	1.32300	.63055	.54292	.5417
D	3.491	1.33500	.63294	.54286	.5431
1906					
J	3.485	1.32985	.63118	.54216	.5446
F	3.516	1.31489	.63207	.54606	.5464
M	3.558	1.30139	.63461	.55124	.5483
A	3.553	1.32718	.63911	.55064	.5503
M	3.576	1.31744	.63994	.55343	.5523
J	3.569	1.31375	.63831	.55254	.5543
J	3.583	1.31247	.63978	.55426	.5561
A	3.623	1.28769	.63988	.55910	.5578
S	3.663	1.27180	.64173	.56385	.5594
O	3.651	1.27450	.64073	.56237	.5608
N	3.637	1.28415	.64083	.56071	.5622
D	3.655	1.27896	.64209	.56291	.5637
1907					
J	3.651	1.29639	.64482	.56240	.5652
F	3.679	1.28744	.64647	.56573	.5669
M	3.741	1.28814	.65390	.57303	.5686
A	3.716	1.31615	.65639	.57014	.5703
M	3.712	1.34247	.66124	.56960	.5718
J	3.726	1.37452	.66992	.57125	.5734
J	3.719	1.37989	.67026	.57037	.5747
A	3.755	1.39052	.67700	.57463	.5757
S	3.761	1.42687	.68659	.57529	.5765
O	3.823	1.43157	.69487	.58235	.5770
N	3.895	1.48795	.71858	.59047	.5769
D	3.828	1.46519	.70459	.58302	.5765
1908					
J	3.739	1.42687	.68413	.57283	.5758
F	3.680	1.46653	.68772	.56577	.5749
M	3.718	1.45852	.69005	.57033	.5737
A	3.709	1.44271	.68473	.56929	.5723
M	3.726	1.39654	.67509	.57129	.5709
J	3.713	1.40395	.67533	.56974	.5695
J	3.692	1.40307	.67272	.56735	.5683
A	3.715	1.34457	.66196	.56987	.5672
S	3.698	1.32798	.65669	.56805	.5664
O	3.696	1.32033	.65480	.56771	.5658
N	3.678	1.30297	.64924	.56556	.5655
D	3.672	1.28964	.64606	.56491	.5654

TABLE 6 (Continued)

Date	1 Sigma "4.50" in Jan. 1925	2 Cum. Log. of sigma slopes	3 Log. "5.00"	4 Log. "4.50"	5 Cyclical curve to Log. "4.50"
1909					
J	3.672	I.26265	.64119	.56493	.5654
F	3.672	I.23288	.63611	.56490	.5656
M	3.681	I.23431	.63739	.56595	.5659
A	3.668	I.25493	.63927	.56436	.5663
M	3.678	I.23567	.63730	.56563	.5669
J	3.702	I.22535	.63837	.56839	.5677
J	3.695	I.22764	.63794	.56759	.5686
A	3.722	I.20460	.63754	.57082	.5698
S	3.754	I.18528	.63834	.57452	.5711
O	3.736	I.22791	.64280	.57240	.5724
N	3.738	I.24172	.64524	.57257	.5738
D	3.753	I.22653	.64461	.57443	.5752
1910					
J	3.761	I.21753	.64401	.57528	.5765
F	3.773	I.20742	.64387	.57672	.5776
M	3.801	I.19514	.64516	.57989	.5786
A	3.812	I.23232	.65217	.58106	.5794
M	3.797	I.26822	.65664	.57940	.5800
J	3.809	I.27206	.65871	.58078	.5806
J	3.827	I.27304	.66097	.58287	.5811
A	3.827	I.26511	.65960	.58291	.5816
S	3.818	I.22396	.65153	.58177	.5820
O	3.796	I.22178	.64874	.57933	.5824
N	3.819	I.22534	.65201	.58203	.5829
D	3.818	I.22516	.65172	.58177	.5833
1911					
J	3.824	I.20565	.64938	.58250	.5838
F	3.844	I.18183	.64807	.58476	.5842
M	3.857	I.18248	.64959	.58619	.5846
A	3.843	I.19405	.64978	.58467	.5850
M	3.841	I.18137	.64772	.58448	.5852
J	3.851	I.17787	.64838	.58565	.5854
J	3.858	I.17496	.64872	.58641	.5854
A	3.868	I.17817	.65030	.58752	.5854
S	3.862	I.20659	.65380	.58677	.5853
O	3.849	I.21454	.65352	.58525	.5852
N	3.833	I.21059	.65111	.58347	.5851
D	3.839	I.21066	.65182	.58417	.5851
1912					
J	3.838	I.20217	.65044	.58410	.5851
F	3.841	I.18775	.64862	.58444	.5852
M	3.857	I.18733	.65034	.58623	.5855
A	3.857	I.19718	.65192	.58633	.5858
M	3.850	I.21290	.65354	.58553	.5863
J	3.865	I.21078	.65488	.58720	.5870
J	3.875	I.20957	.65577	.58828	.5878
A	3.908	I.19431	.65719	.59204	.5889
S	3.918	I.20733	.66025	.59312	.5902
O	3.917	I.20587	.65991	.59299	.5917
N	3.916	I.20704	.65987	.59278	.5934
D	3.929	I.20654	.66134	.59432	.5953

RAILROAD BOND YIELDS

A125

TABLE 6 (Continued)

Date	1 Sigma "4.50" in Jan. 1925	2 Cum. Log. of sigma slopes	3 Log. "5.00"	4 Log. "4.50"	5 Cyclical curve to Log. "4.50"
1913					
J	3.914	I. 20959	.66010	.59261	.5973
F	3.921	I. 21995	.66252	.59340	.5995
M	3.975	I. 23115	.67026	.59934	.6017
A	4.041	I. 20603	.67348	.60655	.6039
M	4.083	I. 21215	.67892	.61103	.6060
J	4.077	I. 26758	.68746	.61033	.6078
J	4.092	I. 25085	.68608	.61186	.6092
A	4.063	I. 23889	.68103	.60883	.6102
S	4.027	I. 23804	.67702	.60496	.6107
O	4.064	I. 23416	.68037	.60895	.6107
N	4.130	I. 21986	.68496	.61585	.6103
D	4.149	I. 21017	.68548	.61790	.6098
1914					
J	4.075	I. 20759	.67732	.61014	.6091
F	4.035	I. 18055	.66897	.60584	.6086
M	4.043	I. 19548	.67200	.60666	.6083
A	4.027	I. 21383	.67318	.60502	.6082
M	4.013	I. 23229	.67458	.60347	.6085
J	4.013	I. 21810	.67238	.60355	.6090
J	4.061	I. 21308	.67665	.60862	.6099
A	*				.6111
S	*				.6126
O	*				.6143
N	*				.6161
D	4.212	I. 26312	.70080	.62446	.6180
1915					
J	4.155	I. 26387	.69509	.61861	.6198
F	4.152	I. 26270	.69456	.61829	.6213
M	4.168	I. 27835	.69894	.61987	.6224
A	4.134	I. 27126	.69420	.61641	.6229
M	4.148	I. 26853	.69506	.61775	.6229
J	4.178	I. 27041	.69869	.62105	.6223
J	4.232	I. 28088	.70603	.62649	.6214
A	4.250	I. 29273	.71017	.62843	.6202
S	4.249	I. 30734	.71279	.62826	.6189
O	4.179	I. 28736	.70180	.62107	.6177
N	4.091	I. 24865	.68562	.61177	.6164
D	4.069	I. 25808	.68494	.60948	.6152
1916					
J	4.048	I. 26399	.68374	.60724	.6140
F	4.050	I. 24936	.68151	.60754	.6127
M	4.063	I. 25195	.68322	.60881	.6112
A	4.071	I. 26014	.68556	.60973	.6097
M	4.078	I. 26515	.68707	.61036	.6082
J	4.071	I. 27807	.68868	.60966	.6067
J	4.066	I. 29502	.69134	.60918	.6053
A	4.078	I. 30182	.69384	.61038	.6042
S	4.077	I. 29103	.69169	.61028	.6034
O	4.039	I. 27487	.68478	.60634	.6031
N	4.011	I. 26793	.68051	.60332	.6033
D	3.997	I. 28618	.68223	.60172	.6041

*Stock Exchange closed.

TABLE 6 (Continued)

Date	1 Sigma "4.50" in Jan. 1925	2 Cum. Log. of sigma slopes	3 Log. "5.00"	4 Log. "4.50"	5 Cyclical curve to Log. "4.50"
1917					
J	3.939	1.28312	.67536	.59542	.6057
F	4.008	1.28093	.68248	.60294	.6081
M	4.039	1.29113	.68770	.60627	.6114
A	4.103	1.32028	.70023	.61315	.6156
M	4.227	1.31435	.71188	.62598	.6205
J	4.264	1.32253	.71738	.62985	.6261
J	4.316	1.31386	.72089	.63509	.6322
A	4.351	1.31092	.72387	.63865	.6385
S	4.416	1.33063	.73417	.64498	.6448
O	4.474	1.32072	.73788	.65071	.6509
N	4.582	1.33741	.75172	.66113	.6566
D	4.624	1.36621	.76177	.66497	.6615
1918					
J	4.577	1.37692	.75981	.66059	.6656
F	4.596	1.32606	.75069	.66244	.6688
M	4.669	1.31930	.75604	.66915	.6711
A	4.718	1.32530	.76187	.67377	.6724
M	4.676	1.30730	.75440	.66988	.6730
J	4.745	1.29462	.75825	.67617	.6731
J	4.730	1.34939	.76798	.67486	.6727
A	4.779	1.31316	.76492	.67925	.6720
S	4.811	1.32888	.77102	.68219	.6714
O	4.733	1.29706	.75770	.67515	.6707
N	4.484	1.26379	.72819	.65172	.6702
D	4.555	1.21358	.72659	.65848	.6699
1919					
J	4.656	1.20078	.73414	.66800	.6698
F	4.683	1.22016	.73968	.67053	.6699
M	4.688	1.26991	.74852	.67097	.6703
A	4.750	1.25401	.75149	.67672	.6711
M	4.740	1.21804	.74459	.67577	.6724
J	4.754	1.20293	.74352	.67706	.6743
J	4.784	1.23438	.75126	.67980	.6768
A	4.835	1.33104	.77363	.68436	.6800
S	4.865	1.33530	.77724	.68709	.6836
O	4.785	1.29828	.76265	.67986	.6877
N	4.874	1.32605	.77618	.68793	.6918
D	4.894	1.35332	.78370	.68973	.6959
1920					
J	4.900	1.33551	.78042	.69023	.6997
F	5.025	1.36562	.79780	.70113	.7030
M	5.030	1.36159	.79741	.70164	.7058
A	5.149	1.40705	.81804	.71170	.7079
M	5.308	1.43869	.83933	.72495	.7092
J	5.315	1.41046	.83265	.72547	.7097
J	5.257	1.42581	.83178	.72074	.7098
A	5.116	1.41463	.81713	.70891	.7095
S	5.049	1.34026	.79442	.70324	.7088
O	4.939	1.30480	.77763	.69360	.7081
N	4.995	1.32348	.78619	.69846	.7075
D	5.130	1.34100	.80139	.71005	.7071

RAILROAD BOND YIELDS

A127

TABLE 6 (Continued)

Date	1 Sigma "4.50" in Jan. 1925	2 Cum. Log. of sigma slopes	3 Log. "5.00"	4 Log. "4.50"	5 Cyclical curve to Log. "4.50"
1921					
J	4.959	1.33680	.78590	.69544	.7067
F	4.998	1.32362	.78657	.69881	.7066
M	5.058	1.32046	.79114	.70402	.7066
A	5.087	1.32223	.79400	.70653	.7063
M	5.138	1.29515	.79299	.71080	.7055
J	5.213	1.33226	.80660	.71709	.7041
J	5.087	1.32334	.79418	.70648	.7016
A	5.028	1.30269	.78506	.70144	.6979
S	4.998	1.26502	.77543	.69875	.6931
O	4.992	1.24958	.77233	.69833	.6870
N	4.749	1.27731	.75545	.67658	.6800
D	4.588	1.29542	.74380	.66156	.6724
1922					
J	4.477	1.31413	.73684	.65098	.6646
F	4.497	1.29874	.73577	.65290	.6571
M	4.523	1.23441	.72685	.65538	.6505
A	4.439	1.22901	.71806	.64734	.6451
M	4.429	1.21253	.71426	.64631	.6411
J	4.407	1.22966	.71475	.64406	.6387
J	4.286	1.26457	.70870	.63210	.6378
A	4.281	1.22471	.70135	.63147	.6382
S	4.282	1.20623	.69858	.63161	.6396
O	4.407	1.18853	.70836	.64406	.6417
N	4.478	1.19842	.71692	.65114	.6444
D	4.470	1.18827	.71456	.65031	.6473
1923					
J	4.457	1.19983	.71498	.64899	.6502
F	4.492	1.19415	.71750	.65237	.6529
M	4.611	1.19856	.72956	.66376	.6556
A	4.629	1.20403	.73217	.66553	.6579
M	4.547	1.21140	.72544	.65767	.6598
J	4.562	1.21089	.72685	.65915	.6615
J	4.556	1.22301	.72816	.65855	.6627
A	4.526	1.22426	.72556	.65575	.6635
S	4.587	1.20043	.72762	.66154	.6638
O	4.614	1.18964	.72855	.66409	.6637
N	4.593	1.17569	.72448	.66205	.6633
D	4.615	1.16127	.72461	.66422	.6627
1924					
J	4.587	1.14648	.71985	.66148	.6619
F	4.621	1.12292	.71995	.66467	.6609
M	4.634	1.10766	.71941	.66604	.6599
A	4.590	1.11913	.71662	.66182	.6588
M	4.560	1.09339	.71062	.65897	.6576
J	4.483	1.10494	.70461	.65157	.6562
J	4.422	1.10952	.69919	.64559	.6547
A	4.486	1.07062	.70088	.65187	.6531
S	4.469	1.08697	.70109	.65020	.6514
O	4.441	1.09117	.69889	.64750	.6499
N	4.460	1.06929	.69817	.64931	.6486
D	4.507	1.04649	.70025	.65389	.6477

TABLE 6 (Continued)

Date	1 Sigma "4.50" in Jan. 1925	2 Cum. Log. of sigma slopes	3 Log. "5.00"	4 Log. "4.50"	5 Cyclical curve to Log. "4.50"
1925					
J	4.500	1.04167	.69904	.65320	.6471
F	4.495	1.02640	.69697	.65271	.6470
M	4.437	1.07922	.69707	.64708	.6472
A	4.396	1.10644	.69626	.64303	.6475
M	4.338	1.11191	.69122	.63733	.6479
J	4.379	1.06747	.69001	.64135	.6481
J	4.436	1.05035	.69373	.64695	.6482
A	4.499	1.03552	.69837	.65316	.6481
S	4.465	1.02654	.69413	.64985	.6477
O	4.510	2.98531	.69440	.65413	.6471
N	4.493	2.98297	.69258	.65253	.6465
D	4.457	2.98238	.68909	.64909	.6457
1926					
J	4.409	2.99371	.68541	.64435	.6449
F	4.372	2.99718	.68204	.64066	.6439
M	4.376	2.99935	.68268	.64109	.6429
A	4.323	2.99353	.67678	.63575	.6417
M	4.306	2.96204	.67225	.63408	.6404
J	4.337	2.91439	.67136	.63716	.6391
J	4.342	2.94484	.67438	.63770	.6377
A	4.346	2.95869	.67600	.63813	.6364
S	4.343	2.95548	.67543	.63783	.6350
O	4.349	2.93573	.67427	.63835	.6336
N	4.307	2.93992	.67045	.63418	.6322
D	4.283	2.95229	.66904	.63172	.6305
1927					
J	4.243	2.96750	.66637	.62772	.6285
F	4.244	2.96464	.66615	.62776	.6262
M	4.184	2.99441	.66267	.62155	.6236
A	4.114	1.01769	.65767	.61428	.6206
M	4.100	1.02674	.65705	.61275	.6175
J	4.132	1.02584	.66040	.61620	.6143
J	4.134	1.02772	.66076	.61636	.6114
A	4.113	1.00086	.65591	.61417	.6089
S	4.076	1.00448	.65231	.61023	.6069
O	4.043	2.98701	.64713	.60670	.6057
N	4.005	2.97114	.64157	.60260	.6052
D	3.996	2.95107	.63887	.60165	.6055
1928					
J	4.010	2.93225	.63881	.60318	.6065
F	4.039	2.91727	.64077	.60634	.6082
M	4.068	2.87495	.64062	.60939	.6104
A	4.086	2.87368	.64244	.61130	.6131
M	4.100	2.92420	.64767	.61269	.6161
J	4.178	2.94415	.65762	.62100	.6193
J	4.259	2.91910	.66388	.62930	.6226
A	4.329	2.89723	.66931	.63644	.6260
S	4.263	2.92070	.66439	.62969	.6294
O	4.276	2.88321	.66288	.63105	.6326
N	4.260	2.84641	.65860	.62936	.6357
D	4.312	2.88210	.66640	.63465	.6385

RAILROAD BOND YIELDS

A129

TABLE 6 (Continued)

Date	1 Sigma "4.50" in Jan. 1925	2 Cum. Log. of sigma slopes	3 Log. "5.00"	4 Log. "4.50"	5 Cyclical curve to Log. "4.50"
1929					
J	4.343	2.88250	.66959	.63781	.6411
F	4.382	2.89393	.67432	.64170	.6432
M	4.407	2.93376	.67986	.64410	.6451
A	4.406	2.90420	.67741	.64401	.6466
M	4.423	2.90522	.67920	.64572	.6477
J	4.464	2.91976	.68432	.64969	.6485
J	4.490	2.90909	.68604	.65225	.6489
A	4.451	2.95525	.68609	.64852	.6488
S	4.521	2.89924	.68823	.65520	.6482
O	4.492	2.85834	.68245	.65239	.6470
N	4.387	2.93611	.67818	.64223	.6452
D	4.349	2.87776	.66979	.63836	.6428
1930					
J	4.333	2.90365	.67018	.63682	.6399
F	4.317	2.94954	.67227	.63519	.6367
M	4.244	2.94058	.66415	.62783	.6334
A	4.304	2.86676	.66452	.63388	.6300
M	4.268	2.89753	.66313	.63023	.6268
J	4.234	2.91729	.66121	.62679	.6237
J	4.182	2.93964	.65766	.62142	.6208
A	4.113	2.96978	.65305	.61420	.6178
S	4.062	2.94580	.64545	.60869	.6146
O	4.034	2.91166	.64845	.60567	.6112
N	4.066	2.90928	.65801	.60916	.6077
D	4.116	2.12325	.66984	.61452	.6041
1931					
J	4.012	2.90388	.64875	.60341	.6008
F	4.018	2.93138	.64878	.60401	.5981
M	4.033	2.90677	.64791	.60561	.5964
A	4.007	2.90899	.65402	.60279	.5960
M	3.918	2.14865	.65174	.59309	.5971
J	3.927	2.16878	.65557	.59414	.5999
J	3.920	2.17315	.65532	.59327	.6042
A	3.950	2.24538	.66985	.59657	.6100
S	3.980	2.36195	.69572	.59988	.6169
O	4.174	2.43658	.73444	.62063	.6246
N	4.321	2.40774	.74214	.63564	.6325
D	4.496	2.53738	.79637	.65283	.6403
1932					
J	4.537	2.45138	.77456	.65680	.6472
F	4.609	2.41490	.77190	.66364	.6527
M	4.509	2.41929	.76346	.65409	.6564
A	4.604	2.51631	.79988	.66314	.6580
M	4.526	2.66061	.84634	.65570	.6573
J	4.556	2.68234	.85900	.65858	.6546
J	4.522	2.59600	.81960	.65532	.6502
A	4.340	2.47676	.76238	.63753	.6444
S	4.274	2.44163	.74593	.63079	.6379
O	4.268	2.45832	.74980	.63015	.6311
N	4.280	2.49997	.76313	.63143	.6245
D	4.119	2.60227	.78147	.61480	.6184

TABLE 6 (Concluded)

Date	1 Sigma "4.50" in Jan. 1925	2 Cum. Log. of sigma slopes	3 Log. "5.00"	4 Σ Log. "4.50"	5 Cyclical curve to Log. "4.50"
1933					
J	3.933	I.59726	.75948	.59471	.6132
F	3.912	I.63219	.77097	.59241	.6090
M	4.051	I.65622	.79632	.60760	.6056
A	4.220	I.65371	.81293	.62529	.6032
M	4.113	I.58383	.77392	.61417	.6013
J	3.996	I.53102	.74302	.60156	.5999
J	3.944	I.48171	.72218	.59591	.5986
A	3.890	I.49248	.71933	.58988	.5971
S	3.870	I.58324	.74724	.58771	.5954
O	3.878	I.59322	.74997	.58861	.5932
N	3.956	I.66751	.78879	.59734	.5907
D	3.939	I.63457	.77292	.59545	.5879
1934					
J	3.884	I.52847	.72833	.58933	.5848
F	3.845	I.41357	.69154	.58486	.5817
M	3.782	I.40198	.68158	.57770	.5783
A	3.726	I.39331	.67304	.57122	.5747
M	3.671	I.40439	.66924	.56478	
J	3.582	I.43042	.66502	.55411	
J	3.579	I.41824	.66165	.55381	
A	3.613	I.45778	.67606	.55794	
S	3.659	I.47808	.68719	.56342	
O	3.603	I.46245	.67606	.55666	
N	3.522	I.46837	.66781	.54678	
D	3.459	I.46112	.65790	.53887	
1935					
J	3.374	I.46468	.64812	.52810	
F	3.283	I.49297	.64430	.51621	
M	3.229	I.56042	.65871	.50909	
A	3.224	I.57781	.66417	.50845	
M	3.269	I.52906	.65365	.51446	
J	3.251	I.52391	.64960	.51204	
J	3.236	I.51338	.64429	.51003	
A	3.291	I.50275	.64832	.51730	
S	3.303	I.51264	.65289	.51886	
O	3.311	I.52135	.65673	.51998	
N	3.270	I.53964	.65714	.51451	
D	3.250	I.52014	.64828	.51191	
1936					
J	3.210	I.48775	.63302	.50645	
F	3.177				
M	3.113				
A	3.100				
M	3.066				
J	3.052				
J	3.075				
A	3.101				
S	3.073				
O	3.064				
N	3.034				
D	2.989				
1937					
J	3.011				

TABLES 7 AND 8

CERTAIN MATHEMATICAL FUNCTIONS AND EQUATIONS DERIVED FROM THE
LOGARITHMS OF THE YIELDS OF THE RAILROAD BONDS USED IN
INDEXES

The information in each horizontal line of these tables refers to a definite group of bonds, each bond in the group having either actual or interpolated quotations on both the dates given in the first two columns. The bonds from which the tables are constructed are, year by year, the same bonds which were used in constructing the bond index numbers. The groups in two horizontal lines may or may not be the same. The names of the bonds used in any particular period may be found by referring to Table 3.

The x's of the table refer in all cases to the logarithms of the yields in the earlier date (first column of table). The y's refer to the logarithms of the yields in the later date (second column of table). All functions and equations are in terms of logarithms; for example, the x's and y's of the equations are in all cases *logarithms* of yields. Thus the first equation in the last column of Table 7 might read "The logarithm of the yield in the later January equals 1.18693 times the logarithm of the yield in the earlier January, minus .13852."

The origin for all equations is zero. At the origin actual yields in both the earlier and the later dates are therefore unity, as $\log 1 = 0$.

The Least Squares Straight Line Equations of Table 7 need no particular description. In the eighth column the earlier January (x) has been considered the independent variable, in the ninth column the later January (y) has been considered the independent variable. In statistical nomenclature, they are the two regression equations.

In the equations which we have termed Sigma Equations *neither* variable is considered independent. They are equations of theoretical linear relationship between x and y, fitted by the method of least squares, the assumption having been made that the tendency to deviation from theory in the x and y elements of each observation is in proportion to the respective x and y standard deviations. For a fuller discussion of the significance of these Sigma Equations see Ch. IV.

Table 7 contains a column entitled 'Root-Mean-Square-Displacement'. These figures give a measure of scatter of the observations about the Sigma line ($y = \frac{\sigma_y}{\sigma_x}x$). This measure of scatter, unlike the coefficient of correlation (r), is not necessarily affected by the mere inclusion or exclusion of bonds of lower and lower grade—in other words by the mere range of the observations.

TABLE 7—AMERICAN RAILROAD BOND
MATHEMATICAL FUNCTIONS

DATES OF IDENTICAL GROUPS OF BONDS ²		ARITHMETIC AVERAGES OF LOGS OF YIELDS		STANDARD DEVIATIONS OF LOGS OF YIELDS		ROOT-MEAN SQUARE DISPLACE- MENT
x (earlier date)	y (later date)	M _x	M _y	σ _x	σ _y	√σ _x σ _y (1-r)
Jan. 1857	Jan. 1858	.90277	.93300	.05577	.06620	.0163
Jan. 1858	Jan. 1859	.93493	.86427	.06473	.04906	.0263
Jan. 1859	Jan. 1860	.86427	.87007	.04906	.05930	.0138
Jan. 1860	Jan. 1861	.87007	.86380	.05930	.05494	.0088
Jan. 1861	Jan. 1862	.86600	.85327	.05407	.04704	.0097
Jan. 1862	Jan. 1863	.87218	.73518	.04985	.04106	.0234
Jan. 1863	Jan. 1864	.74552	.78100	.04625	.03567	.0096
Jan. 1864	Jan. 1865	.77968	.79309	.03537	.03458	.0150
Jan. 1865	Jan. 1866	.79232	.86447	.03662	.02559	.0198
Jan. 1866	Jan. 1867	.86932	.85168	.02700	.02867	.0116
Jan. 1867	Jan. 1868	.85230	.85430	.02851	.02901	.0082
Jan. 1868	Jan. 1869	.85300	.86325	.02916	.03361	.0102
Jan. 1869	Jan. 1870	.85852	.87048	.02922	.03075	.0106
Jan. 1870	Jan. 1871	.87376	.85400	.02716	.02231	.0133
Jan. 1871	Jan. 1872	.85400	.83576	.02231	.02108	.0145
Jan. 1872	Jan. 1873	.84043	.84596	.02454	.02418	.0054
Jan. 1873	Jan. 1874	.84652	.84790	.02355	.02641	.0047
Jan. 1874	Jan. 1875	.84576	.82033	.02553	.03266	.0089
Jan. 1875	Jan. 1876	.82057	.79195	.03334	.03418	.0094
Jan. 1876	Jan. 1877	.79195	.77967	.03418	.03624	.0139
Jan. 1877	Jan. 1878	.78145	.77755	.03623	.03212	.0098
Jan. 1878	Jan. 1879	.78759	.75659	.03216	.03520	.0065
Jan. 1879	Jan. 1880	.75752	.73126	.02458	.02352	.0057
Jan. 1880	Jan. 1881	.74288	.69312	.03275	.03307	.0072
Jan. 1881	Jan. 1882	.69692	.70058	.03510	.03929	.0104
Jan. 1882	Jan. 1883	.70379	.70121	.03939	.03256	.0076
Jan. 1883	Jan. 1884	.70145	.69652	.03227	.03363	.0060
Jan. 1884	Jan. 1885	.69647	.69019	.03310	.03471	.0088
Jan. 1885	Jan. 1886	.69103	.65241	.03480	.03272	.0063
Jan. 1886	Jan. 1887	.65216	.64489	.03281	.03023	.0076
Jan. 1887	Jan. 1888	.64508	.65249	.03030	.03108	.0085
Jan. 1888	Jan. 1889	.65414	.64803	.02817	.03545	.0073
Jan. 1889	Jan. 1890	.63850	.63639	.03523	.02960	.0089
Jan. 1890	Jan. 1891	.63989	.65421	.02969	.02956	.0068
Jan. 1891	Jan. 1892	.65500	.65095	.02958	.02671	.0075
Jan. 1892	Jan. 1893	.65090	.64644	.02730	.02679	.0057
Jan. 1893	Jan. 1894	.64649	.64789	.02724	.02861	.0075
Jan. 1894	Jan. 1895	.64783	.62450	.02910	.02979	.0072
Jan. 1895	Jan. 1896	.62650	.62853	.03076	.03356	.0070
Jan. 1896	Jan. 1897	.62735	.61635	.03323	.03133	.0072
Jan. 1897	Jan. 1898	.61525	.59144	.03139	.03104	.0075
Jan. 1898	Jan. 1899	.58980	.57486	.03353	.03312	.0092
Jan. 1899	Jan. 1900	.57368	.58059	.03341	.03501	.0078
Jan. 1900	Jan. 1901	.58276	.57192	.03561	.03133	.0051
Jan. 1901	Jan. 1902	.57192	.57059	.03133	.02961	.0065
Jan. 1902	Jan. 1903	.57124	.58361	.02948	.02466	.0055
Jan. 1903	Jan. 1904	.58338	.59630	.02437	.02191	.0055
Jan. 1904	Jan. 1905	.59697	.58067	.02183	.01872	.0048
Jan. 1905	Jan. 1906	.58465	.58775	.02115	.01996	.0060
Jan. 1906	Jan. 1907	.58872	.60551	.02001	.01853	.0041
Jan. 1907	Jan. 1908	.60551	.63105	.01853	.02502	.0074
Jan. 1908	Jan. 1909	.63105	.60482	.02502	.01714	.0061
Jan. 1909	Jan. 1910	.60482	.61327	.02068	.01838	.0042
Jan. 1910	Jan. 1911	.61355	.61975	.01889	.01838	.0033
Jan. 1911	Jan. 1912	.61975	.62105	.01838	.01824	.0040
Jan. 1912	Jan. 1913	.62170	.63086	.01861	.01893	.0037
Jan. 1913	Jan. 1914	.63056	.64793	.01904	.01895	.0056
Jan. 1914	Jan. 1915	.64870	.66251	.01940	.02208	.0049
Jan. 1915	Jan. 1916	.66172	.65037	.02296	.02297	.0055
Jan. 1916	Jan. 1917	.64988	.63998	.02328	.02433	.0041
Jan. 1917	Jan. 1918	.64020	.71617	.02484	.03083	.0099
Jan. 1918	Jan. 1919	.71617	.70505	.03083	.02055	.0079
Jan. 1919	Jan. 1920	.70505	.74076	.02055	.02802	.0067
Jan. 1920	Jan. 1921	.74076	.74612	.02802	.02811	.0063
Jan. 1921	Jan. 1922	.74612	.69907	.02811	.02668	.0083
Jan. 1922	Jan. 1923	.69907	.68595	.02668	.02050	.0067
Jan. 1923	Jan. 1924	.68595	.69417	.02050	.01813	.0055
Jan. 1924	Jan. 1925	.69417	.67888	.01813	.01425	.0044
Jan. 1925	Jan. 1926	.68471	.67258	.01854	.01660	.0033
Jan. 1926	Jan. 1927	.67344	.65511	.01774	.01670	.0039
Jan. 1927	Jan. 1928	.65667	.63004	.01749	.01613	.0033
Jan. 1928	Jan. 1929	.63144	.66302	.01638	.01460	.0052
Jan. 1929	Jan. 1930	.66302	.66320	.01460	.01533	.0049
Jan. 1930	Jan. 1931	.65593	.62939	.00936	.01272	.0041
Jan. 1931	Jan. 1932	.64041	.75290	.02114	.05491	.0132
Jan. 1932	Jan. 1933	.73806	.70841	.04199	.05875	.0172
Jan. 1933	Jan. 1934	.71155	.68790	.05698	.04807	.0142
Jan. 1934	Jan. 1935	.68211	.60821	.04557	.03934	.0128
Jan. 1935	Jan. 1936	.60821	.59093	.03934	.04149	.0106

Note 1. These are the yields in Table 3.

Note 2. The variables are the *logarithms* of bond yields. The first two columns give, of course, only the dates to which yields relate.

Note 3. For a description of the nature of these equations see Ch. IV.

YIELDS¹, JANUARIES 1857-1936 AND EQUATIONS

EQUATIONS OF LEAST SQUARES STRAIGHT LINES FITTED TO LOGARITHMS OF YIELDS

When x is the independent variable	When y is the independent variable
y = 1.10138x - .06129	x = .78178y + .17337
y = .59365x + .30925	x = 1.03341y + .04178
y = 1.13043x - .10692	x = .77373y + .19107
y = .90440x + .07691	x = 1.05376y - .04017
y = .83750x + .12800	x = 1.10666y - .07828
y = .60311x + .20916	x = .88927y + .21841
y = .72839x + .23797	x = 1.22440y - .21074
y = .79911x + .17004	x = .83582y + .11680
y = .40729x + .54177	x = .83450y + .07092
y = .87710x + .08920	x = .77811y + .20662
y = .93383x + .05840	x = .90231y + .08146
y = 1.03003x - .01629	x = .77535y + .18458
y = .92035x + .08035	x = .83126y + .13493
y = .58128x + .34611	x = .86123y + .13827
y = .52305x + .38908	x = .88631y + .36398
y = .93582x + .05947	x = .96427y + .02470
y = 1.08146x - .06758	x = .85969y + .11759
y = 1.15797x - .15903	x = .70774y + .26520
y = .94505x + .01647	x = .89946y + .08832
y = .89541x + .07055	x = .79616y + .17121
y = .81405x + .14141	x = 1.03583y - .02396
y = .83941x + .10147	x = 1.08492y - .04039
y = .90281x + .04736	x = .98636y + .03624
y = .96113x - .02088	x = .94236y + .08971
y = 1.03073x - .01775	x = .82278y + .12050
y = .78936x + .14567	x = 1.15484y - .10599
y = 1.00821x - .01069	x = .92788y + .05516
y = .97754x + .00936	x = .88932y + .08267
y = .90693x + .02570	x = 1.02621y + .02152
y = .86773x + .07899	x = 1.02254y - .00727
y = .94724x + .06455	x = .90026y + .05767
y = 1.19214x - .13980	x = .75296y + .17222
y = .77607x + .14087	x = 1.09958y - .06126
y = .94347x + .05049	x = .95181y + .01721
y = .83892x + .10146	x = 1.02889y - .01476
y = .93837x + .03566	x = .97443y + .02099
y = .97394x + .01825	x = .88309y + .07435
y = .96167x + .00150	x = .91807y + .07449
y = 1.03861x - .02216	x = .87283y + .07790
y = .89557x + .05452	x = 1.00755y + .00635
y = .93117x + .01854	x = .95216y + .05211
y = .91150x + .03726	x = .93452y + .05258
y = .99399x + .01036	x = .90485y + .04833
y = .86661x + .06690	x = 1.11962y - .05757
y = .90267x + .05433	x = 1.01057y - .00470
y = .80243x + .12523	x = 1.14697y - .09814
y = .84878x + .10114	x = 1.04937y - .04236
y = .80833x + .09812	x = 1.09918y - .04129
y = .86305x + .08317	x = .96914y + .01504
y = .88302x + .08566	x = 1.03009y - .03501
y = 1.18972x - .08933	x = .65234y + .19385
y = .62602x + .20977	x = 1.33354y - .17550
y = .85993x + .09121	x = 1.05856y - .04209
y = .94246x + .04150	x = .99548y - .00340
y = .94508x + .03534	x = .96034y + .02333
y = .97735x + .02324	x = .94449y + .02586
y = .91024x + .07397	x = .91860y + .03537
y = 1.07525x - .03500	x = .82974y + .09899
y = .94266x + .02659	x = .94211y + .09490
y = 1.01478x + .12523	x = .92927y - .05517
y = 1.08113x + .02403	x = .70192y + .13751
y = .60087x + .27473	x = 1.35223y - .23722
y = 1.25581x - .14465	x = .67526y + .20484
y = .95228x + .04071	x = .94667y + .03443
y = .86211x + .05583	x = .95695y + .07715
y = .70536x + .19285	x = 1.19403y - .11997
y = .81234x + .13695	x = 1.03854y - .03497
y = .72675x + .17439	x = 1.17757y - .10526
y = .86384x + .08110	x = 1.07730y - .03986
y = .89358x + .05333	x = 1.00832y + .01288
y = .88682x + .04751	x = 1.04319y - .00038
y = .79267x + .16250	x = .99679y - .02945
y = .93597x + .01951	x = .84931y + .09069
y = 1.16478x + .13460	x = .63060y + .25904
y = 2.20674x - .66032	x = .32714y + .39410
y = 1.23178x - .20072	x = .62916y + .29235
y = .78109x + .13212	x = 1.09740y - .04335
y = .78521x + .07261	x = 1.05333y + .04146
y = .98144x - .00599	x = .88247y + .08672

SIGMA EQUATIONS² OF STRAIGHT LINES FITTED TO LOGARITHMS OF YIELDS

$y = a + \frac{by}{x}$
y = 1.18693x - .13852
y = .75793x + .15566
y = 1.20872x - .17459
y = .92642x + .05775
y = .86993x + .09901
y = .82353x + .01691
y = .77130x + .20598
y = .97779x + .03073
y = .69861x + .31095
y = 1.06171x - .07129
y = 1.01732x - .01276
y = 1.15259x - .12095
y = 1.05222x - .03287
y = .82155x + .13616
y = .94451x + .02915
y = .98514x + .01802
y = 1.12159x - .10155
y = 1.27914x - .26152
y = 1.02509x - .04921
y = 1.06050x - .06019
y = .88651x + .08479
y = .87960x + .07011
y = .95671x + .00653
y = 1.00991x - .05712
y = 1.11926x - .07945
y = .82675x + .11935
y = 1.04239x - .03466
y = 1.04843x - .04001
y = .94009x + .00278
y = .92120x + .04412
y = 1.02576x - .00921
y = 1.25843x - .09998
y = .84011x + .09998
y = .99561x + .01713
y = .90297x + .05950
y = .98132x + .00770
y = 1.05018x - .03104
y = 1.02347x - .03853
y = 1.00084x - .05488
y = .94279x + .02489
y = .98892x - .01699
y = .98761x - .00763
y = 1.04810x - .02068
y = .87978x + .05922
y = .94511x + .03006
y = .83643x + .10381
y = .89936x + .07163
y = .85755x + .06874
y = .94368x + .03603
y = .92586x + .06044
y = 1.35047x - .18667
y = .68516x + .17245
y = .90131x + .06609
y = .97301x + .02276
y = .99202x + .00625
y = 1.01725x - .00156
y = .99544x + .02025
y = 1.13837x - .07595
y = 1.00030x - .01155
y = 1.04500x - .03914
y = .24107x - .07836
y = .66660x + .22765
y = 1.36372x - .22073
y = 1.00296x + .00317
y = .94916x - .00912
y = .76860x + .14864
y = .88442x + .08750
y = .78559x + .13355
y = .89547x + .05944
y = .94139x + .02114
y = .92201x + .02440
y = .89175x + .09993
y = 1.04977x - .03274
y = 1.35906x - .26206
y = 2.59721x - .91038
y = 1.39922x - .32430
y = .84366x + .08759
y = .86340x + .01928
y = 1.05459x - .05048

TABLE 8—AMERICAN RAILROAD BOND YIELDS¹, QUARTERLY, JANUARY 1857-JANUARY 1936. MATHEMATICAL FUNCTIONS AND EQUATIONS

DATES OF IDENTICAL GROUPS OF BONDS ²		ARITHMETIC AVERAGES OF LOGS OF YIELDS		STANDARD DEVIATIONS OF LOGS OF YIELDS		SIGMA EQUATIONS ³ OF STRAIGHT LINES FITTED TO LOGARITHMS OF YIELDS
x (earlier date)	y (later date)	M _x	M _y	σ _x	σ _y	
Jan. 1857	April 1857	.90277	.90200	.05577	.05520	y = .98971x + .00852
April " "	July " "	.90200	.91738	.05520	.06091	y = 1.10343x - .07791
July " "	Oct. " "	.91738	.99308	.06091	.06918	y = 1.13578x - .04886
Oct. " "	Jan. 1858	.99308	.93300	.06918	.06620	y = .95694x - .01732
Jan. 1858	April " "	.93493	.89673	.06473	.05627	y = .86929x + .08400
April " "	July " "	.89673	.88627	.05627	.05868	y = 1.04290x - .04893
July " "	Oct. " "	.88627	.87047	.05868	.05096	y = .86841x + .10082
Oct. " "	Jan. 1859	.87047	.86427	.05096	.04906	y = .96271x + .02626
Jan. 1859	April " "	.86427	.86160	.04906	.05093	y = 1.03809x - .03559
April " "	July " "	.86160	.87993	.05093	.05288	y = 1.03835x - .01471
July " "	Oct. " "	.87993	.87080	.05288	.05281	y = .99859x - .00789
Oct. " "	Jan. 1860	.87080	.87007	.05281	.05930	y = 1.12296x - .07080
Jan. 1860	April " "	.87007	.85873	.05930	.05119	y = .86331x + .10759
April " "	July " "	.85873	.83953	.05119	.04848	y = .94705x + .02627
July " "	Oct. " "	.83953	.84147	.04848	.05116	y = 1.05514x - .04436
Oct. " "	Jan. 1861	.84147	.86380	.05116	.05494	y = 1.07388x - .03984
Jan. 1861	April " "	.86600	.86107	.05407	.05222	y = .96565x + .02482
April " "	July " "	.86107	.86747	.05222	.05446	y = 1.04302x - .03064
July " "	Oct. " "	.86747	.87887	.05446	.05282	y = .96985x + .03755
Oct. " "	Jan. 1862	.87887	.85327	.05282	.04704	y = .89056x + .07058
Jan. 1862	April " "	.85327	.85453	.04985	.04539	y = .91055x - .06036
April " "	July " "	.85453	.82212	.04539	.04121	y = .90788x + .04631
July " "	Oct. " "	.82212	.77959	.04121	.04187	y = 1.01591x - .05561
Oct. " "	Jan. 1863	.77959	.73518	.04187	.04106	y = .89059x - .02928
Jan. 1863	April " "	.74552	.75519	.04625	.04320	y = .93404x - .05864
April " "	July " "	.75519	.76238	.04320	.04452	y = 1.03061x - .01595
July " "	Oct. " "	.76238	.75938	.04452	.03697	y = .83033x + .12635
Oct. " "	Jan. 1864	.75938	.78100	.03697	.03567	y = .96494x + .04824
Jan. 1864	April " "	.77968	.74373	.03537	.03708	y = 1.04849x - .07376
April " "	July " "	.74373	.70395	.03708	.05425	y = 1.46270x - .38395
July " "	Oct. " "	.70395	.76914	.05425	.04277	y = .78837x + .21417
Oct. " "	Jan. 1865	.76914	.79309	.04277	.03458	y = .80865x + .17109
Jan. 1865	April " "	.79232	.83247	.03662	.03398	y = .92767x - .09746
April " "	July " "	.83247	.83953	.03398	.03564	y = 1.04909x - .03381
July " "	Oct. " "	.83953	.84958	.03564	.02894	y = .81197x + .16791
Oct. " "	Jan. 1866	.84958	.86447	.02894	.02559	y = .88408x + .11337
Jan. 1866	April " "	.86932	.87216	.02700	.03247	y = 1.20266x - .17344
April " "	July " "	.87216	.85463	.03247	.02925	y = .90089x + .06891
July " "	Oct. " "	.85463	.84568	.02925	.02335	y = 1.10373x - .09931
Oct. " "	Jan. 1867	.84568	.85168	.02335	.02867	y = .88622x + .10222
Jan. 1867	April " "	.85230	.85725	.02851	.03124	y = 1.09554x - .07648
April " "	July " "	.85725	.85000	.03124	.03264	y = 1.04481x - .04566
July " "	Oct. " "	.85000	.85300	.03264	.03235	y = .99104x + .01262
Oct. " "	Jan. 1868	.85300	.85490	.03235	.02901	y = .89680x + .08754
Jan. 1868	April " "	.85390	.84940	.02916	.03115	y = 1.06815x - .06270
April " "	July " "	.84940	.84470	.03115	.02836	y = .91059x + .07124
July " "	Oct. " "	.84470	.85425	.02836	.03241	y = 1.14276x - .11104
Oct. " "	Jan. 1869	.85425	.86325	.03241	.03361	y = .93697x - .02258
Jan. 1869	April " "	.85852	.86395	.02922	.02634	y = .90152x + .08998
April " "	July " "	.86395	.86124	.02634	.02783	y = 1.05648x - .05151
July " "	Oct. " "	.86124	.87052	.02783	.02939	y = 1.05607x - .03901
Oct. " "	Jan. 1870	.87052	.87048	.02939	.03075	y = 1.04612x - .04019
Jan. 1870	April " "	.87376	.85638	.02716	.02303	y = .84795x + .11548
April " "	July " "	.85638	.84814	.02303	.01985	y = .86168x + .11021
July " "	Oct. " "	.84814	.85462	.01985	.02287	y = 1.15226x - .12266
Oct. " "	Jan. 1871	.85462	.85400	.02287	.02231	y = .97580x + .02006
Jan. 1871	April " "	.85400	.84900	.02231	.01832	y = .92090x + .14795
April " "	July " "	.84900	.84476	.01832	.01764	y = .96297x - .07720
July " "	Oct. " "	.84476	.84871	.01764	.02313	y = 1.31150x - .25919
Oct. " "	Jan. 1872	.84871	.83576	.02313	.02108	y = .91104x + .06255
Jan. 1872	April " "	.84043	.84283	.02454	.02113	y = .86074x + .11944
April " "	July " "	.84283	.83448	.02113	.02613	y = 1.23708x - .20817
July " "	Oct. " "	.83448	.84670	.02613	.02571	y = .98374x + .02579
Oct. " "	Jan. 1873	.84670	.84596	.02571	.02418	y = .94048x + .04966
Jan. 1873	April " "	.84652	.84833	.02355	.02529	y = 1.07367x - .06055
April " "	July " "	.84833	.84181	.02529	.02450	y = .96900x + .01978
July " "	Oct. " "	.84181	.87305	.02450	.03131	y = 1.27805x - .20283
Oct. " "	Jan. 1874	.87305	.84790	.03131	.02641	y = .84350x + .11148
Jan. 1874	April " "	.84790	.83790	.02641	.02839	y = 1.11171x - .10254
April " "	July " "	.83790	.83829	.02839	.03336	y = 1.17514x - .14636
July " "	Oct. " "	.83829	.83210	.03336	.03497	y = 1.04837x - .04674

RAILROAD BOND YIELDS

A135

TABLE 8—AMERICAN RAILROAD BOND YIELDS¹, QUARTERLY, JANUARY 1857-JANUARY 1936. MATHEMATICAL FUNCTIONS AND EQUATIONS—(Continued)

DATES OF IDENTICAL GROUPS OF BONDS ²		ARITHMETIC AVERAGES OF LOGS OF YIELDS		STANDARD DEVIATIONS OF LOGS OF YIELDS		SIGMA EQUATIONS ³ OF STRAIGHT LINES FITTED TO LOGARITHMS OF YIELDS
x (earlier date)	y (later date)	M _x	M _y	σ _x	σ _y	$y = a + \frac{\sigma_y}{\sigma_x} x$
Oct. 1874	Jan. 1875	.83210	.82033	.03497	.03266	$y = .93394x + .04320$
Jan. 1875	April " "	.82057	.81110	.03334	.03680	$y = 1.10391x - .09474$
April " "	July " "	.81110	.80638	.03680	.03456	$y = .93899x + .04477$
July " "	Oct. " "	.80638	.80462	.03456	.03568	$y = 1.03233x - .02783$
Oct. " "	Jan. 1876	.80462	.79195	.03568	.03418	$y = .95796x + .02116$
Jan. 1876	April " "	.79195	.78643	.03418	.03136	$y = .91768x + .05967$
April " "	July " "	.78643	.78029	.03136	.03473	$y = 1.10732x - .09054$
July " "	Oct. " "	.78029	.78448	.03473	.03034	$y = .87371x + .10273$
Oct. " "	Jan. 1877	.78448	.77967	.03034	.03624	$y = 1.19449x - .15738$
Jan. 1877	April " "	.78145	.79125	.03624	.02916	$y = .80504x + .16215$
April " "	July " "	.79125	.77745	.02916	.03027	$y = 1.03782x - .04373$
July " "	Oct. " "	.77745	.78265	.03027	.03076	$y = 1.01634x - .00750$
Oct. " "	Jan. 1878	.78265	.77755	.03076	.03212	$y = 1.04401x - .03954$
Jan. 1878	April " "	.77755	.77959	.03212	.02931	$y = .91146x + .06824$
April " "	July " "	.77959	.77082	.02931	.03054	$y = 1.04198x - .04150$
July " "	Oct. " "	.77082	.77073	.03054	.03101	$y = 1.01550x - .01204$
Oct. " "	Jan. 1879	.77073	.75659	.03101	.02829	$y = .91203x + .05366$
Jan. 1879	April " "	.75659	.75252	.02829	.02220	$y = .90323x + .06831$
April " "	July " "	.75252	.73417	.02220	.02475	$y = 1.11466x - .10463$
July " "	Oct. " "	.73417	.74026	.02475	.02403	$y = .97087x + .02748$
Oct. " "	Jan. 1880	.74026	.73126	.02403	.02352	$y = .97877x + .00672$
Jan. 1880	April " "	.73126	.73278	.02352	.03093	$y = .94442x + .03569$
April " "	July " "	.73278	.72572	.03093	.03597	$y = 1.16290x - .13166$
July " "	Oct. " "	.72572	.71424	.03597	.03390	$y = .94256x + .03021$
Oct. " "	Jan. 1881	.71424	.69312	.03390	.03307	$y = .97558x - .00368$
Jan. 1881	April " "	.69312	.70427	.03307	.03547	$y = 1.01035x - .07473$
April " "	July " "	.70427	.68565	.03547	.03830	$y = .95976x + .04348$
July " "	Oct. " "	.68565	.70154	.03830	.03676	$y = 1.06885x - .04926$
Oct. " "	Jan. 1882	.70154	.70058	.03676	.03929	$y = .97177x + .01972$
Jan. 1882	April " "	.70058	.70364	.03929	.03828	$y = .99170x + .00159$
April " "	July " "	.70364	.69939	.03828	.03796	$y = .96737x + .02639$
July " "	Oct. " "	.69939	.70296	.03796	.03672	$y = .88682x + .07781$
Oct. " "	Jan. 1883	.70296	.70121	.03672	.03256	$y = .96575x + .02654$
Jan. 1883	April " "	.70121	.70397	.03256	.03116	$y = .97761x + .01453$
April " "	July " "	.70397	.70274	.03116	.03046	$y = .97531x + .01993$
July " "	Oct. " "	.70274	.70532	.03046	.02971	$y = 1.13203x - .10192$
Oct. " "	Jan. 1884	.70532	.69652	.02971	.03363	$y = .84225x + .09946$
Jan. 1884	April " "	.69652	.68606	.03363	.02788	$y = 1.17986x - .10432$
April " "	July " "	.68606	.70513	.02788	.03290	$y = .96080x + .02114$
July " "	Oct. " "	.70513	.69863	.03290	.03161	$y = 1.09809x - .07697$
Oct. " "	Jan. 1885	.69863	.69019	.03161	.03471	$y = 1.04846x - .04261$
Jan. 1885	April " "	.69019	.68191	.03471	.03649	$y = 1.02578x - .02796$
April " "	July " "	.68191	.67153	.03649	.03743	$y = .96114x + .01954$
July " "	Oct. " "	.67153	.66497	.03743	.03598	$y = .90944x + .04766$
Oct. " "	Jan. 1886	.66497	.65241	.03598	.03272	$y = .94017x - .03100$
Jan. 1886	April " "	.65241	.64414	.03272	.03085	$y = 1.01069x - .01419$
April " "	July " "	.64414	.63684	.03085	.03118	$y = .96649x + .02926$
July " "	Oct. " "	.63684	.64476	.03118	.03014	$y = 1.00307x - .00185$
Oct. " "	Jan. 1887	.64476	.64489	.03014	.03023	$y = .97349x + .02072$
Jan. 1887	April " "	.64489	.64870	.03023	.02950	$y = 1.06987x - .03418$
April " "	July " "	.64870	.64984	.02950	.03156	$y = .96282x + .03927$
July " "	Oct. " "	.64984	.64985	.03156	.03038	$y = 1.02291x - .02769$
Oct. " "	Jan. 1888	.64985	.65249	.03038	.03108	$y = 1.01682x - .01122$
Jan. 1888	April " "	.65249	.65392	.03108	.02865	$y = 1.12943x - .09237$
April " "	July " "	.65392	.64224	.02865	.03227	$y = 1.00975x - .05910$
July " "	Oct. " "	.64224	.64800	.03227	.03542	$y = 1.00089x - .00855$
Oct. " "	Jan. 1889	.64800	.64003	.03542	.03545	$y = 1.02469x - .02071$
Jan. 1889	April " "	.64003	.63355	.03545	.03610	$y = .88767x + .06404$
April " "	July " "	.63355	.62642	.03610	.03205	$y = .95043x + .03758$
July " "	Oct. " "	.62642	.63295	.03205	.03046	$y = .97179x + .02130$
Oct. " "	Jan. 1890	.63295	.63639	.03046	.02960	$y = 1.01193x - .00341$
Jan. 1890	April " "	.63639	.64211	.02960	.03005	$y = .97049x + .02187$
April " "	July " "	.64211	.64503	.03005	.02916	$y = 1.01342x - .00010$
July " "	Oct. " "	.64503	.65379	.02916	.02939	$y = 1.00036x - .00018$
Oct. " "	Jan. 1891	.65379	.65421	.02939	.02955	$y = .99872x + .00720$
Jan. 1891	April " "	.65421	.66136	.02955	.02955	$y = .99731x + .01021$
April " "	July " "	.66136	.66979	.02955	.02947	$y = .90613x + .05634$
July " "	Oct. " "	.66979	.66326	.02947	.02670	$y = 1.00048x - .01263$
Oct. " "	Jan. 1892	.66326	.65095	.02670	.02671	$y = .96181x + .02070$
Jan. 1892	April " "	.65095	.64674	.02671	.02626	

TABLE 8—AMERICAN RAILROAD BOND YIELDS¹, QUARTERLY, JANUARY 1857-JANUARY 1936. MATHEMATICAL FUNCTIONS AND EQUATIONS—(Continued)

DATES OF IDENTICAL GROUPS OF BONDS ²		ARITHMETIC AVERAGES OF LOGS OF YIELDS		STANDARD DEVIATIONS OF LOGS OF YIELDS		SIGMA EQUATIONS ³ OF STRAIGHT LINES FITTED TO LOGARITHMS OF YIELDS
x (earlier date)	y (later date)	M _x	M _y	σ _x	σ _y	y = a + $\frac{\sigma_y}{\sigma_x}$ x
April 1892	July 1892	.64674	.64136	.02626	.02645	y = 1.00733x - .01012
July " "	Oct. " "	.64136	.64626	.02645	.02712	y = 1.02519x - .01126
Oct. " "	Jan. 1893	.64626	.64644	.02712	.02679	y = .98797x + .00795
Jan. 1893	April " "	.64649	.64714	.02724	.02786	y = 1.02275x - .01406
April " "	July " "	.64714	.67338	.02786	.03382	y = 1.21399x - .11224
July " "	Oct. " "	.67338	.66465	.03382	.02908	y = .85988x + .08562
Oct. " "	Jan. 1894	.66465	.64789	.02908	.02861	y = .98365x - .00589
Jan. 1894	April " "	.64789	.63381	.02910	.02836	y = .97433x + .00261
April " "	July " "	.63381	.63658	.02836	.02995	y = 1.05600x - .03272
July " "	Oct. " "	.63658	.62708	.02995	.02917	y = .97408x + .00700
Oct. " "	Jan. 1895	.62708	.62450	.02917	.02979	y = 1.02120x - .01587
Jan. 1895	April " "	.62650	.63297	.03076	.03107	y = 1.00990x + .00027
April " "	July " "	.63297	.61755	.03107	.02936	y = .94500x + .01939
July " "	Oct. " "	.61755	.61429	.02936	.02944	y = 1.00266x - .00490
Oct. " "	Jan. 1896	.61429	.62300	.02944	.03356	y = 1.13999x - .07175
Jan. 1896	April " "	.62300	.62916	.03043	.03043	y = .91573x + .04852
April " "	July " "	.62916	.63735	.03043	.03362	y = 1.10503x - .05927
July " "	Oct. " "	.63735	.61635	.03362	.03396	y = 1.01006x + .00186
Oct. " "	Jan. 1897	.61635	.60744	.03396	.03133	y = .92342x + .02845
Jan. 1897	April " "	.61525	.60744	.03139	.03267	y = 1.04061x - .03280
April " "	July " "	.60744	.59797	.03267	.03304	y = 1.01157x - .01650
July " "	Oct. " "	.59797	.60156	.03304	.03335	y = 1.00922x - .00192
Oct. " "	Jan. 1898	.60156	.59144	.03335	.03104	y = .93088x + .03146
Jan. 1898	April " "	.58980	.61006	.03353	.03526	y = 1.05161x - .01018
April " "	July " "	.61006	.59383	.03526	.03460	y = .98113x - .00472
July " "	Oct. " "	.59383	.58920	.03460	.03140	y = .90766x + .05020
Oct. " "	Jan. 1899	.58920	.57486	.03140	.03312	y = 1.05459x - .04650
Jan. 1899	April " "	.57368	.56988	.03341	.03402	y = 1.01828x - .01429
April " "	July " "	.56988	.56724	.03402	.03303	y = .97091x + .01394
July " "	Oct. " "	.56724	.57779	.03303	.03363	y = 1.01838x - .00012
Oct. " "	Jan. 1900	.57779	.58059	.03363	.03501	y = 1.04099x - .02088
Jan. 1900	April " "	.58059	.57527	.03501	.03431	y = .96356x + .01375
April " "	July " "	.57527	.57992	.03431	.03493	y = 1.01790x - .00565
July " "	Oct. " "	.57992	.58008	.03493	.03285	y = .94050x + .03467
Oct. " "	Jan. 1901	.58008	.57192	.03285	.03133	y = .95375x + .01867
Jan. 1901	April " "	.57192	.57005	.03133	.03101	y = .98927x - .00401
April " "	July " "	.57005	.57370	.03101	.03009	y = .97044x - .02050
July " "	Oct. " "	.57370	.57541	.03009	.03046	y = 1.01221x - .00529
Oct. " "	Jan. 1902	.57541	.57059	.03046	.02961	y = .97214x - .01121
Jan. 1902	April " "	.57124	.56905	.02948	.02891	y = .98063x - .00887
April " "	July " "	.56905	.57416	.02891	.02580	y = .89253x + .06627
July " "	Oct. " "	.57416	.58126	.02580	.02565	y = .99410x + .01049
Oct. " "	Jan. 1903	.58126	.58361	.02565	.02466	y = .96133x + .02483
Jan. 1903	April " "	.58361	.59362	.02437	.02200	y = .90297x + .06685
April " "	July " "	.59362	.60014	.02200	.02142	y = .97351x - .02224
July " "	Oct. " "	.60014	.60043	.02142	.02255	y = 1.05288x - .03145
Oct. " "	Jan. 1904	.60043	.59630	.02255	.02191	y = .97172x + .01285
Jan. 1904	April " "	.59630	.59672	.02183	.01958	y = .89659x + .06148
April " "	July " "	.59672	.58828	.01958	.01854	y = .94706x + .02315
July " "	Oct. " "	.58828	.58642	.01854	.01840	y = .99244x - .00259
Oct. " "	Jan. 1905	.58642	.58067	.01840	.01872	y = 1.01762x - .01608
Jan. 1905	April " "	.58465	.58570	.02115	.02066	y = .97646x + .01481
April " "	July " "	.58570	.58440	.02066	.02066	y = 1.00015x - .00139
July " "	Oct. " "	.58440	.58495	.02066	.01978	y = .95728x + .02552
Oct. " "	Jan. 1906	.58495	.58775	.01978	.01996	y = 1.00940x - .00270
Jan. 1906	April " "	.58872	.59692	.02001	.01989	y = .99386x + .01181
April " "	July " "	.59692	.59900	.01989	.01923	y = .96669x + .02196
July " "	Oct. " "	.59900	.60336	.01923	.01762	y = .91628x + .05451
Oct. " "	Jan. 1907	.60336	.60551	.01762	.01853	y = 1.05173x - .02906
Jan. 1907	April " "	.60551	.61526	.01853	.01939	y = 1.04655x - .01844
April " "	July " "	.61526	.62262	.01939	.02246	y = 1.15810x - .08991
July " "	Oct. " "	.62262	.64121	.02246	.02530	y = 1.12637x - .06009
Oct. " "	Jan. 1908	.64121	.63105	.02530	.02502	y = .89923x - .00325
Jan. 1908	April " "	.63105	.62967	.02502	.02595	y = 1.03716x - .02483
April " "	July " "	.62967	.62246	.02595	.02369	y = .91277x + .04772
July " "	Oct. " "	.62246	.61326	.02369	.01958	y = .82654x + .09877
Oct. " "	Jan. 1909	.61326	.60482	.01958	.01714	y = .87563x + .06783
Jan. 1909	April " "	.60709	.60577	.02068	.02032	y = .98236x + .00939
April " "	July " "	.60577	.60648	.02032	.01908	y = .93909x + .03761
July " "	Oct. " "	.60648	.61132	.01908	.01909	y = 1.00064x + .00445
Oct. " "	Jan. 1910	.61132	.61327	.01909	.01864	y = .97637x + .01640

TABLE 8—AMERICAN RAILROAD BOND YIELDS¹, QUARTERLY, JANUARY 1857-JANUARY 1936. MATHEMATICAL FUNCTIONS AND EQUATIONS—(Continued)

DATES OF IDENTICAL GROUPS OF BONDS ²		ARITHMETIC AVERAGES OF LOGS OF YIELDS		STANDARD DEVIATIONS OF LOGS OF YIELDS		SIGMA EQUATIONS ³ OF STRAIGHT LINES FITTED TO LOGARITHMS OF YIELDS
x (earlier date)	y (later date)	M _x	M _y	σ _x	σ _y	
Jan. 1910	April 1910	.61355	.62066	.01889	.01955	y = 1.03463x - .01414
April " "	July " "	.62066	.62636	.01955	.02147	y = 1.09830x - .05531
July " "	Oct. " "	.62636	.61798	.02147	.01908	y = .88867x + .06135
Oct. " "	Jan. 1911	.61798	.61975	.01908	.01838	y = .96554x + .02430
Jan. 1911	April " "	.61975	.62093	.01838	.01790	y = .97365x + .01751
April " "	July " "	.62093	.62111	.01790	.01713	y = .95700x + .02688
July " "	Oct. " "	.62111	.62327	.01713	.01877	y = 1.09544x - .05712
Oct. " "	Jan. 1912	.62327	.62105	.01877	.01824	y = .97189x + .01530
Jan. 1912	April " "	.62170	.62350	.01861	.01839	y = .98857x + .00891
April " "	July " "	.62350	.62652	.01839	.01893	y = 1.02894x + .01502
July " "	Oct. " "	.62652	.63091	.01893	.01877	y = .99155x + .00968
Oct. " "	Jan. 1913	.63091	.63086	.01877	.01893	y = 1.00860x - .00548
Jan. 1913	April " "	.63086	.64419	.01893	.01888	y = .99181x + .01879
April " "	July " "	.64419	.63460	.01888	.02094	y = 1.10875x - .06065
July " "	Oct. " "	.63460	.64912	.02094	.02015	y = .96231x + .02015
Oct. " "	Jan. 1914	.64912	.64793	.02015	.01895	y = .94067x + .03732
Jan. 1914	April " "	.64870	.64414	.01940	.01968	y = 1.01448x - .01395
April " "	July " "	.64414	.64767	.01968	.01965	y = .99827x + .00464
July " "	Jan. 1915	.64767	.66251	.01965	.02208	
Jan. 1915	April " "	.66172	.66026	.02296	.02336	y = 1.01717x - .01282
April " "	July " "	.66026	.67133	.02336	.02388	y = 1.02241x - .00373
July " "	Oct. " "	.67133	.66658	.02388	.02424	y = 1.01504x - .01485
Oct. " "	Jan. 1916	.66658	.65037	.02424	.02297	y = .94761x + .01871
Jan. 1916	April " "	.65037	.65200	.02297	.02307	y = .95116x + .00766
April " "	July " "	.65200	.65498	.02307	.02500	y = 1.08362x - .01554
July " "	Oct. " "	.65498	.65007	.02500	.02387	y = .95467x + .02478
Oct. " "	Jan. 1917	.65007	.63998	.02387	.02433	y = 1.01917x - .02255
Jan. 1917	April " "	.64020	.66193	.02484	.02706	y = 1.08932x - .03545
April " "	July " "	.66193	.68315	.02706	.02666	y = .98530x + .03095
July " "	Oct. " "	.68315	.69954	.02666	.02708	y = 1.01595x + .00549
Oct. " "	Jan. 1918	.69954	.71617	.02708	.03083	y = 1.13814x - .08000
Jan. 1918	April " "	.71617	.72312	.03083	.02737	y = .88793x + .08721
April " "	July " "	.72312	.72702	.02737	.02893	y = 1.05705x - .03735
July " "	Oct. " "	.72702	.72139	.02893	.02565	y = .88649x + .07689
Oct. " "	Jan. 1919	.72139	.70505	.02565	.02323	y = .80116x + .12710
Jan. 1919	April " "	.70505	.71861	.02323	.02220	y = 1.13041x - .07839
April " "	July " "	.71861	.71983	.02220	.02257	y = .95581x + .03298
July " "	Oct. " "	.71983	.72624	.02257	.02572	y = 1.15849x - .10768
Oct. " "	Jan. 1920	.72624	.74076	.02572	.02802	y = 1.08949x - .05047
Jan. 1920	April " "	.74076	.77127	.02802	.03304	y = 1.17909x - .10215
April " "	July " "	.77127	.78295	.03304	.03450	y = 1.04413x - .02236
July " "	Oct. " "	.78295	.74068	.03450	.02611	y = .75680x + .14814
Oct. " "	Jan. 1921	.74068	.74612	.02611	.02811	y = 1.07646x - .05119
Jan. 1921	April " "	.74612	.75554	.02811	.02718	y = .96700x + .03404
April " "	July " "	.75554	.75361	.02718	.02725	y = 1.00256x - .00186
July " "	Oct. " "	.75361	.73978	.02725	.02299	y = .84380x + .10220
Oct. " "	Jan. 1922	.73978	.69907	.02299	.02197	y = 1.16027x - .15927
Jan. 1922	April " "	.69907	.68695	.02197	.02380	y = .82374x + .11110
April " "	July " "	.68695	.67500	.02380	.01998	y = 1.08308x - .06902
July " "	Oct. " "	.67500	.68007	.01998	.02050	y = .83938x + .11349
Oct. " "	Jan. 1923	.68007	.68595	.02050	.02070	y = 1.02633x - .01203
Jan. 1923	April " "	.68595	.70285	.02070	.02163	y = 1.00973x + .01023
April " "	July " "	.70285	.69754	.02163	.02003	y = 1.04467x - .03671
July " "	Oct. " "	.69754	.70020	.02003	.01813	y = .92605x + .05424
Oct. " "	Jan. 1924	.70020	.69417	.01813	.01703	y = .90539x + .06022
Jan. 1924	April " "	.69417	.69251	.01703	.01665	y = .93896x + .04071
April " "	July " "	.69251	.67561	.01665	.01597	y = .97812x - .00175
July " "	Oct. " "	.67561	.67629	.01597	.01425	y = .93644x + .02862
Oct. " "	Jan. 1925	.67629	.67888	.01425	.02152	y = .89228x + .07544
Jan. 1925	April " "	.67888	.67962	.02152	.01891	y = 1.16085x - .11523
April " "	July " "	.67962	.67911	.01891	.01628	y = .87884x + .08183
July " "	Oct. " "	.67911	.68182	.01628	.01660	y = .86093x + .09715
Oct. " "	Jan. 1926	.68182	.67258	.01660	.01773	y = 1.01952x - .02255
Jan. 1926	April " "	.67258	.66482	.01773	.01585	y = .99956x - .00832
April " "	July " "	.66482	.66369	.01585	.01552	y = .89394x + .06938
July " "	Oct. " "	.66369	.66380	.01552	.01670	y = .97924x + .01389
Oct. " "	Jan. 1927	.66380	.63511	.01670	.01963	y = 1.07589x - .05907
Jan. 1927	April " "	.63511	.64700	.01963	.02009	y = 1.19249x - .09033
April " "	July " "	.64700	.64984	.02009	.01829	y = 1.02336x - .01227
July " "	Oct. " "	.64984	.63718	.01829		y = .91052x + .04549

TABLE 8—AMERICAN RAILROAD BOND YIELDS¹, QUARTERLY, JANUARY 1857-JANUARY 1936. MATHEMATICAL FUNCTIONS AND EQUATIONS—(Concluded)

DATES OF IDENTICAL GROUPS OF BONDS ²		ARITHMETIC AVERAGES OF LOGS OF YIELDS		STANDARD DEVIATIONS OF LOGS OF YIELDS		SIGMA EQUATIONS ³ OF STRAIGHT LINES FITTED TO LOGARITHMS OF YIELDS
x (earlier date)	y (later date)	M _x	M _y	σ _x	σ _y	
Oct. 1927	Jan. 1928	.63718	.63004	.01829	.01613	y = .88153x + .06835
Jan. 1928	Apr. "	.63144	.63600	.01638	.01431	y = .87383x + .08423
Apr. "	July "	.63600	.65672	.01431	.01589	y = 1.11024x - .04939
July "	Oct. "	.65672	.65630	.01589	.01463	y = .92069x + .05166
Oct. "	Jan. 1929	.65630	.66302	.01463	.01460	y = .99836x + .00780
Jan. 1929	Apr. "	.66302	.67051	.01460	.01535	y = 1.05123x - .02648
Apr. "	July "	.67051	.67905	.01535	.01553	y = 1.01134x + .00094
July "	Oct. "	.67905	.67623	.01553	.01381	y = .88972x + .07207
Oct. "	Jan. 1930	.67623	.66328	.01381	.01533	y = 1.10980x - .08720
Jan. 1930	Apr. "	.66328	.65143	.01533	.00936	y = .91858x + .04891
Apr. "	July "	.65143	.64218	.00936	.00860	y = 1.18275x - .12830
July "	Oct. "	.64218	.63018	.00860	.01017	y = 1.18034x - .12781
Oct. "	Jan. 1931	.63018	.62939	.01017	.01200	y = 1.05979x - .03847
Jan. 1931	Apr. "	.64041	.64459	.01200	.01272	y = 1.12983x - .07896
Apr. "	July "	.64459	.64390	.01272	.02389	y = 1.21132x - .13690
July "	Oct. "	.64390	.71349	.02389	.05307	y = 1.83413x - .46751
Oct. "	Jan. 1932	.71349	.75290	.05307	.05491	y = 1.03468x + .01467
Jan. 1932	Apr. "	.73806	.75750	.04199	.04876	y = 1.16126x - .09958
Apr. "	July "	.75750	.76869	.04876	.05858	y = 1.20142x - .14139
July "	Oct. "	.76869	.71272	.05858	.04266	y = .72832x + .15287
Oct. "	Jan. 1933	.71272	.70841	.04266	.05875	y = 1.37703x - .27303
Jan. 1933	Apr. "	.71155	.75835	.05698	.06489	y = 1.13882x - .05198
Apr. "	July "	.75835	.68545	.06489	.04367	y = .67298x + .17510
July "	Oct. "	.68545	.70303	.04367	.05580	y = 1.27780x - .17284
Oct. "	Jan. 1934	.70303	.68790	.05580	.04807	y = .86149x + .08225
Jan. 1934	Apr. "	.68211	.63918	.04557	.03338	y = .73254x + .13951
Apr. "	July "	.63918	.62579	.03338	.03535	y = 1.05907x - .05115
July "	Oct. "	.62579	.63636	.03535	.03914	y = 1.10718x - .05650
Oct. "	Jan. 1935	.63636	.60821	.03914	.03934	y = 1.00517x - .03144
Jan. 1935	Apr. "	.60821	.61239	.03934	.05105	y = 1.29756x - .17680
Apr. "	July "	.61239	.59964	.05105	.04401	y = .86215x + .07167
July "	Oct. "	.59964	.61125	.04401	.04483	y = 1.01853x + .00050
Oct. "	Jan. 1936	.61125	.59003	.04483	.04149	y = .92555x + .02519

Note 1. These are the yields in Table 3.

Note 2. The variables are the *logarithms* of bond yields. The first two columns give, of course, only the dates to which the yields relate.

Note 3. For a description of the nature of these equations see Ch. IV.

RAILROAD BOND YIELDS

A139

TABLE 9
MONTH TO MONTH SLOPES $\left(\frac{\Delta Y}{Y}\right)$ OF 'SIGMA LINES' FITTED TO THE LOGARITHMS OF THE YIELDS OF AMERICAN RAILROAD BONDS
JANUARY 1879-JANUARY 1936

YEAR	JAN. AND FEB.	FEB. AND MARCH	MAR. AND APRIL	APRIL AND MAY	MAY AND JUNE	JUNE AND JULY	JULY AND AUG.	AUG. AND SEPT.	SEPT. AND OCT.	OCT. AND NOV.	NOV. AND D C.	DEC. AND JAN.
1879	.88227	1.02401	.99075	1.04212	1.04019	1.02828	.98030	.95906	1.03266	1.02803	.95869	.99310
1880	.97338	.99993	.97032	.99478	1.08514	1.07728	.97570	.96961	.99632	.99168	1.00773	.97622
1881	.93210	1.03475	1.04775	1.05954	.97966	1.04016	1.00109	.94570	1.01367	1.04615	1.01504	1.00656
1882	1.03630	.96833	.96840	.98968	.96257	1.04101	.99162	.95807	1.01825	.96521	1.01289	.99555
1883	1.05614	.96423	.94834	.99951	.99518	.98281	.99162	.97865	1.03810	.96513	1.05297	1.11393
1884	.90470	.95109	.97884	1.05025	1.09796	1.02317	.97286	1.04434	1.02637	1.01402	.96010	1.12792
1885	1.02153	1.01748	1.00872	1.04293	.99280	.99069	.99964	.99613	.96521	.96385	1.00392	.93986
1886	.97592	.97969	.98334	1.00782	.95459	1.05055	1.02006	.94906	.99834	.97214	.99733	1.03458
1887	1.01331	.99957	.96017	.99012	.99305	1.08810	.98450	.96468	1.01379	1.02415	.97705	.92735
1888	1.01907	.99447	1.00334	1.01905	1.07099	1.03211	.99474	1.06935	1.03183	.99011	.96982	1.04235
1889	1.01804	1.08439	.92870	.98275	.95575	.94507	.95681	.96970	1.02436	1.04770	.97946	.94700
1890	1.02716	1.00483	.96044	1.01481	.96671	.98907	1.02372	1.01387	.97640	1.06047	1.00848	.93539
1891	.97616	1.05739	.96759	1.01222	.99457	.99065	.97794	.99757	.92883	.97737	.95558	1.07133
1892	.98301	.98752	.99080	.97662	1.02537	1.00593	1.00791	1.02404	.99327	.97140	1.01689	.99721
1893	.96854	1.04732	1.00826	1.05642	1.03585	1.10939	1.06854	.87206	.92185	.93517	.95374	1.10286
1894	.96940	.95905	1.04801	1.03233	.99377	1.02634	1.00633	.99278	.97557	1.02418	1.00767	.98949
1895	1.00263	1.00658	1.00067	1.01375	.97125	.95977	1.03903	.98347	.97322	.99162	1.14876	1.00075
1896	.97445	.96203	.97483	.99462	1.04175	1.00648	1.08534	.93011	1.00056	.92542	.97413	1.02323
1897	.99311	.99311	1.01988	1.00989	1.01918	.99165	.97354	1.06607	1.00740	.96379	1.00230	.96363
1898	.99426	1.03473	1.02315	.99913	.98692	1.08250	.97666	.98307	.99637	1.03178	1.01030	1.01169
1899	.98420	1.01654	1.00747	.98303	.98642	1.00127	.99987	1.01609	1.00238	.99661	1.09221	.95635
1900	.98345	1.00406	.97582	1.03150	1.00763	.97934	.98568	.99085	.96297	.98060	.98672	.98572
1901	.98527	.98527	.99382	1.00245	.97947	.98836	1.01929	1.01953	.97403	.98560	1.00085	.98550
1902	1.01733	.97575	.98787	.96495	.95260	.97097	.97917	.99464	1.02072	.97697	1.03669	.94916
1903	.96996	.98577	.99437	1.03793	1.04394	.89846	.92121	1.07639	1.06183	1.02232	.97858	.97111
1904	.99802	.93085	.96511	.95166	1.00276	.99243	.92637	1.00556	.96160	.97234	1.01289	1.03234
1905	.94677	1.00500	1.00713	1.00032	1.01589	.98419	.99197	.98493	.97980	.99360	1.02802	.98821

TABLE 9 (Concluded)
 FITTED TO THE LOGARITHMS OF THE YIELDS OF AMERICAN RAILROAD BONDS
 MONTH TO MONTH SLOPES $\left(\frac{\sigma Y}{\sigma X}\right)$ OF 'SIGMA LINES' JANUARY 1899-JANUARY 1936

YEAR	JAN. AND FEB.	FEB. AND MARCH	MAR. AND APRIL	APRIL AND MAY	MAY AND JUNE	JUNE AND JULY	JULY AND AUG.	AUG. AND SEPT.	SEPT. AND OCT.	OCT. AND NOV.	NOV. AND DEC.	DEC. AND JAN.
1906	.96614	.96939	1.06118	.97783	.99153	.99705	.94454	.96408	1.00623	1.02248	.98813	1.04096
1907	.97960	1.00162	1.06662	1.06249	1.07658	1.01245	1.02477	1.08730	1.01089	1.13861	.94895	.91554
1908	1.09563	.98172	.96426	.89915	1.01722	.99797	.87397	.96252	.96082	.96078	.96978	.93974
1909	.93375	1.00329	1.04862	.95662	.97651	1.00529	.94834	.95649	1.10314	1.03230	.96563	.97949
1910	.97699	.97211	1.08938	1.08617	1.00888	1.00227	.98190	.99560	.99560	1.00824	.99859	.95666
1911	.94662	1.00150	1.02701	.97123	.99198	.99332	1.00743	1.06764	1.01848	.99094	1.00015	.98063
1912	.96734	.99903	1.02394	1.03687	.99512	.99722	.96548	1.03044	.99665	1.00269	.99884	1.00705
1913	1.02414	1.02612	.94379	1.01420	1.13614	.96222	.97284	.99804	.99111	.96762	.97794	.99407
1914	.93964	1.03498	1.04315	1.04342	.96786	.98850	1.12213	.....	.....	.....	.....	1.00172
1915	.99731	1.03670	.98381	.99374	1.00433	1.02441	1.02766	1.03422	.95504	.91472	1.02196	1.01370
1916	.96687	1.00507	1.01904	1.01160	1.03020	1.03979	1.01577	.97547	.96348	.98414	1.04292	.99298
1917	.99496	1.02376	1.06942	.98643	1.01901	.98023	.99326	1.04644	.97745	1.03917	1.06856	1.02497
1918	.88949	.98456	1.01390	.95940	.97122	1.13442	.91997	1.03685	.92936	.92625	.89083	.97095
1919	1.04564	1.12138	.96406	.92052	.96580	1.07511	1.24928	1.00985	.91828	1.06603	1.06480	.95982
1920	1.07179	.99076	1.11036	1.07557	.93706	1.03597	.97458	.84261	.92159	1.04395	1.04116	.99037
1921	.97011	.99274	1.00409	.93954	1.08931	.97968	.95357	.91692	.96507	1.06594	1.04358	1.04403
1922	.96511	.98244	.99078	.96078	1.03370	.98337	.98337	.94833	1.02303	1.03703	.97489	1.02697
1923	.98701	1.01021	1.01268	1.01711	.99882	1.02831	1.00289	.94660	.97547	.96838	.96734	.94652
1924	.94719	.96548	1.02676	.94245	1.02696	1.01060	.91433	1.03837	1.00971	.95087	.94886	.98896
1925	.96545	1.12934	1.06469	1.01268	.90274	.96134	.96644	.97953	.90943	.99463	.99864	1.02642
1926	1.00802	1.00500	.98668	.93005	.89608	1.07264	1.03240	.90264	.95554	1.00969	1.02890	1.03564
1927	.99344	1.07094	1.05506	1.02105	.99793	1.00454	.94002	1.00836	.96058	.96411	.98464	.98853
1928	.99346	.99346	.99346	.99346	.99346	.99346	.99346	.99346	.99346	.99346	.99346	1.00093
1929	1.02666	1.09606	.93420	1.00236	1.03405	.97574	1.11215	.87900	.91013	1.19593	.87428	1.06143
1930	1.11145	.97958	.84369	1.07343	1.04656	1.05282	1.07186	.94627	1.16375	1.14188	1.13231	.81966
1931	.98742	.94490	1.21094	1.14488	1.04745	1.01011	1.18094	1.30789	1.18749	.93575	1.34786	.82035
1932	.91943	1.01017	1.25031	1.39413	1.05130	.81971	.75991	.92230	1.03917	1.10066	1.26562	.98853
1933	1.08375	1.05690	.99424	.85138	.88851	.89266	1.02513	1.23240	1.01142	1.18655	.92696	.78325
1934	.96753	.97366	.98024	.89254	1.06176	.97258	1.09533	1.04785	.96466	1.03735	.98345	1.01313
1935	1.06731	1.10802	1.04085	.89383	.98822	.97605	.97382	1.02503	1.02026	1.04501	.95609	.92813

TABLE 10

SHORT TIME INTEREST RATES, BOND YIELDS AND STOCK PRICES

- Col. 1 Call Money Rates at the New York Stock Exchange.
- Col. 2 90-day Time Money Rates in New York City.
- Col. 3 Commercial Paper Rates in New York City. (January 1857 to December 1923 'choice 60-90 day two name paper'; January 1924 to January 1936 '4 to 6 month prime double and single name paper').
- Col. 4 Unadjusted Index Number of the Yields of American Railroad Bonds.
- Col. 5 Adjusted Index Number of the Yields of American Railroad Bonds.¹
- Col. 6 Index Number of the Prices of American Railroad Stocks weighted by the number of shares outstanding at the beginning of each year.

¹The long time economic 'drift' has been eliminated from this index number. The month to month movements are almost identical with the month to month movements of the unadjusted index given in Column 4, whereas the long time movements are the long time movements of the '4.50 Sigma' index given in Table 6.

TABLE 10

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adjust. Bonds	6 Stock Prices
1857						
J	8.00	.....	8.81	9.644	6.621	21.22
F	8.75	.....	8.81	9.577	6.577	20.83
M	9.25	.....	9.25	9.592	6.592	20.82
A	7.88	.....	9.00	9.627	6.619	20.41
M	7.38	.....	8.19	9.731	6.696	20.10
J	6.60	.....	7.90	9.949	6.849	18.87
J	6.75	.....	8.50	9.991	6.882	18.61
A	9.50	.....	10.00	10.086	6.952	17.70
S	15.00	.....	18.00	11.128	7.674	15.14
O	18.00	.....	24.00	11.926	8.230	12.83
N	8.00	.....	11.50	11.105	7.668	14.65
D	7.00	.....	8.00	10.661	7.367	15.27
1858						
J	6.50	.....	7.50	10.376	7.175	15.69
F	4.88	.....	5.75	9.857	6.820	17.16
M	4.44	.....	5.50	9.525	6.595	17.45
A	4.20	.....	5.19	9.478	6.566	16.56
M	3.50	.....	3.64	9.377	6.500	16.82
J	3.60	.....	4.31	9.323	6.467	16.10
J	3.50	.....	3.71	9.260	6.425	16.17
A	3.50	.....	4.05	9.255	6.427	15.98
S	4.12	.....	4.44	9.149	6.356	15.78
O	3.55	.....	4.40	8.907	6.192	16.25
N	4.05	.....	4.69	8.802	6.122	16.16
D	4.00	.....	4.62	8.774	6.107	15.88
1859						
J	4.31	.....	4.62	8.776	6.111	15.93
F	5.00	.....	5.50	8.758	6.101	15.73
M	4.54	.....	5.17	8.757	6.105	15.66
A	4.50	.....	5.28	8.726	6.086	15.28
M	5.88	.....	6.47	8.887	6.202	14.80
J	5.96	.....	6.89	9.120	6.368	14.91
J	5.59	.....	6.62	9.110	6.364	14.98
A	6.38	.....	7.04	9.047	6.323	15.10
S	5.96	.....	6.54	8.868	6.199	15.70
O	6.03	.....	6.75	8.922	6.240	15.40
N	5.25	.....	6.19	8.969	6.275	15.57
D	5.81	.....	6.75	8.935	6.255	15.43
1860						
J	6.69	.....	8.00	8.920	6.247	15.11
F	5.88	.....	7.10	8.855	6.206	15.21
M	5.50	.....	5.90	8.779	6.156	15.85
A	5.25	.....	5.60	8.671	6.084	16.68
M	5.31	.....	5.80	8.507	5.973	16.97
J	4.75	.....	5.50	8.357	5.872	17.20
J	5.25	.....	5.40	8.288	5.828	17.73
A	5.63	.....	6.10	8.258	5.812	18.81
S	6.50	.....	7.00	8.274	5.828	19.28
O	6.75	.....	6.80	8.333	5.875	18.62
N	7.13	.....	11.10	8.731	6.163	16.57
D	7.25	.....	12.90	9.115	6.440	15.49

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adj. Bonds	6 Stock Prices
1861						
J	5.75	.....	8.00	8.781	6.210	17.09
F	5.50	.....	7.30	8.687	6.153	17.02
M	5.75	.....	6.10	8.604	6.101	17.41
A	5.13	.....	6.20	8.676	6.160	16.09
M	6.25	.....	8.10	9.130	6.492	14.86
J	5.50	.....	6.50	9.055	6.449	15.01
J	5.50	.....	5.50	8.812	6.285	15.63
A	4.50	.....	6.50	8.833	6.310	15.30
S	5.75	.....	6.30	8.963	6.415	15.27
O	6.50	.....	6.80	9.042	6.482	15.86
N	6.50	.....	6.30	8.971	6.442	16.06
D	6.50	.....	7.00	8.952	6.440	15.59
1862						
J	6.50	.....	6.30	8.513	6.136	16.54
F	6.00	.....	5.90	8.172	5.902	17.12
M	5.50	.....	6.30	8.235	5.959	17.65
A	5.50	.....	6.10	8.164	5.920	17.51
M	4.60	.....	5.00	7.734	5.621	18.34
J	4.10	.....	4.50	7.519	5.476	19.23
J	5.40	.....	5.50	7.569	5.525	18.80
A	4.00	.....	4.50	7.400	5.414	19.44
S	4.30	.....	5.00	7.149	5.244	20.83
O	4.60	.....	4.50	6.863	5.045	22.89
N	6.30	.....	4.70	6.700	4.939	23.08
D	6.00	.....	5.50	6.741	4.981	23.54
1863						
J	6.10	.....	5.30	6.189	4.585	26.60
F	6.30	.....	5.70	5.979	4.440	27.53
M	6.10	.....	5.30	6.059	4.510	27.04
A	5.20	.....	5.30	6.325	4.721	27.36
M	5.30	.....	5.20	6.324	4.730	29.96
J	6.10	.....	5.40	6.381	4.785	29.01
J	6.10	.....	5.60	6.432	4.835	29.69
A	6.00	.....	5.30	6.459	4.866	31.79
S	6.60	.....	5.60	6.440	4.863	31.83
O	6.50	.....	5.70	6.379	4.828	32.69
N	7.00	.....	6.60	6.506	4.935	32.78
D	7.00	.....	6.80	6.617	5.032	32.49
1864						
J	7.00	.....	7.30	6.702	5.107	33.86
F	6.10	.....	6.50	6.645	5.076	35.48
M	5.90	.....	5.60	6.424	4.917	37.99
A	6.80	.....	6.70	6.170	4.734	38.68
M	5.60	.....	6.90	6.145	4.724	36.99
J	6.70	.....	6.80	6.024	4.642	37.69
J	6.80	.....	6.50	5.651	4.363	37.34
A	6.90	.....	7.70	5.660	4.379	37.62
S	7.00	.....	9.00	6.074	4.710	35.42
O	6.80	.....	9.20	6.549	5.089	33.14
N	6.90	.....	8.30	6.480	5.045	34.88
D	6.60	.....	7.80	6.658	5.194	34.58

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adj. Bonds	6 Stock Prices
1865						
J	7.00	.....	8.00	6.908	5.401	32.93
F	6.10	.....	8.50	7.100	5.562	32.16
M	7.00	.....	9.00	7.468	5.860	29.17
A	5.60	.....	8.50	7.577	5.957	28.75
M	5.40	.....	7.20	7.537	5.935	29.39
J	4.90	.....	6.70	7.846	6.190	28.83
J	5.50	.....	7.30	7.701	6.086	30.07
A	5.90	.....	7.70	7.734	6.121	29.73
S	6.00	.....	7.10	7.781	6.166	30.95
O	7.00	.....	7.60	7.871	6.247	31.84
N	6.80	.....	8.00	7.993	6.353	32.12
D	6.80	.....	7.80	8.050	6.408	31.65
1866						
J	5.50	.....	7.37	8.143	6.491	30.20
F	6.06	.....	7.28	8.189	6.534	29.44
M	5.56	.....	7.32	8.272	6.607	29.54
A	5.38	.....	6.69	8.202	6.558	30.03
M	5.40	.....	6.05	8.039	6.434	30.65
J	4.88	.....	5.56	7.990	6.400	31.05
J	4.88	.....	5.89	7.873	6.311	31.59
A	4.13	.....	5.89	7.804	6.259	32.80
S	4.19	.....	5.25	7.751	6.222	32.95
O	4.35	.....	5.45	7.718	6.197	33.95
N	6.00	.....	6.69	7.668	6.160	33.45
D	6.38	.....	6.88	7.790	6.259	32.78
1867						
J	7.18	.....	7.40	7.822	6.288	31.51
F	5.81	.....	7.06	7.844	6.307	31.22
M	6.06	.....	7.19	7.856	6.317	31.01
A	6.19	.....	7.17	7.913	6.364	30.33
M	4.80	.....	6.67	7.932	6.380	30.68
J	6.19	.....	7.38	7.928	6.375	31.74
J	4.50	.....	6.55	7.784	6.259	32.88
A	4.25	.....	6.50	7.768	6.245	33.03
S	5.63	.....	7.12	7.784	6.257	32.98
O	10.76	.....	8.40	7.875	6.330	32.91
N	7.22	.....	8.56	7.953	6.390	32.81
D	6.50	.....	7.94	7.985	6.415	33.29
1868						
J	5.65	.....	7.06	7.859	6.312	34.50
F	4.69	.....	6.50	7.770	6.239	35.30
M	9.35	.....	7.67	7.743	6.216	35.12
A	11.53	.....	8.00	7.780	6.245	34.91
M	5.50	.....	6.62	7.725	6.199	36.12
J	3.50	.....	5.72	7.699	6.176	36.71
J	4.15	.....	6.50	7.692	6.169	36.72
A	3.75	.....	6.62	7.711	6.183	36.34
S	4.87	.....	6.75	7.788	6.245	36.66
O	9.04	.....	7.44	7.869	6.308	37.21
N	17.03	.....	10.00	7.959	6.380	36.16
D	11.40	.....	8.25	8.031	6.437	36.88

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adjust. Bonds	6 Stock Prices
1869						
J	12.02	.....	8.31	8.036	6.439	38.23
F	6.74	.....	7.69	8.048	6.449	38.52
M	9.02	.....	9.40	8.103	6.494	38.23
A	9.73	.....	9.88	8.133	6.518	38.89
M	6.75	.....	7.81	8.021	6.428	40.59
J	23.67	.....	9.65	8.003	6.418	40.96
J	9.79	.....	10.25	8.084	6.483	40.87
A	6.38	.....	9.56	8.065	6.471	41.44
S	19.54	.....	10.94	8.150	6.545	38.75
O	5.63	.....	10.38	8.264	6.639	38.44
N	6.25	.....	11.94	8.305	6.676	38.16
D	7.96	.....	10.17	8.350	6.717	37.52
1870						
J	6.19	.....	9.00	8.263	6.651	38.07
F	5.50	.....	7.38	8.006	6.451	39.29
M	5.15	.....	7.50	7.901	6.371	39.05
A	5.63	.....	7.19	7.934	6.403	39.66
M	4.56	.....	6.38	7.862	6.350	41.22
J	4.20	.....	5.46	7.797	6.304	41.54
J	5.06	.....	6.38	7.781	6.297	40.27
A	4.70	.....	7.18	7.862	6.368	39.54
S	5.50	.....	7.25	7.888	6.394	39.89
O	5.25	.....	7.28	7.903	6.412	40.06
N	5.50	.....	7.25	7.919	6.431	40.06
D	11.45	.....	8.75	7.959	6.468	39.61
1871						
J	6.49	.....	7.22	7.890	6.418	39.70
F	4.13	.....	6.62	7.841	6.383	40.11
M	4.20	.....	6.25	7.819	6.369	40.97
A	5.84	.....	6.78	7.797	6.355	42.05
M	3.55	.....	5.50	7.741	6.312	43.00
J	3.00	.....	5.06	7.730	6.307	42.69
J	3.25	.....	4.90	7.720	6.301	41.91
A	2.80	.....	5.52	7.681	6.270	42.18
S	4.44	.....	6.66	7.654	6.250	42.38
O	12.36	.....	10.03	7.797	6.368	40.25
N	6.35	.....	9.28	7.850	6.412	40.58
D	10.25	.....	9.94	7.788	6.359	41.38
1872						
J	8.78	.....	8.30	7.562	6.174	42.29
F	6.93	.....	7.56	7.522	6.139	42.55
M	8.44	.....	8.62	7.614	6.213	43.87
A	13.68	.....	8.66	7.600	6.199	45.20
M	6.20	.....	7.20	7.601	6.196	45.03
J	4.50	.....	6.00	7.556	6.155	44.56
J	3.65	.....	6.45	7.462	6.074	44.19
A	3.81	.....	7.56	7.541	6.131	43.57
S	10.33	.....	10.00	7.619	6.189	43.03
O	6.43	.....	10.80	7.672	6.224	42.95
N	7.73	.....	11.62	7.727	6.262	42.68
D	20.06	.....	10.83	7.742	6.266	43.82

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adjust. Bonds	6 Stock Prices
1873						
J	7.20	.....	9.28	7.658	6.190	44.25
F	10.30	.....	9.38	7.640	6.166	44.79
M	13.26	.....	10.12	7.657	6.170	44.42
A	27.52	.....	11.40	7.692	6.187	43.66
M	6.09	.....	8.12	7.671	6.160	43.73
J	4.63	.....	6.83	7.631	6.118	43.36
J	3.80	.....	6.44	7.576	6.062	43.21
A	4.63	.....	7.06	7.589	6.062	42.93
S	61.23	.....	14.28	7.734	6.166	39.74
O	14.91	.....	16.50	8.150	6.486	36.42
N	9.40	.....	14.50	8.179	6.497	35.11
D	7.88	.....	9.80	7.953	6.304	33.28
1874						
J	5.50	.....	7.44	7.685	6.080	40.36
F	4.13	.....	6.00	7.570	5.979	41.47
M	4.00	.....	6.14	7.568	5.966	40.73
A	4.15	.....	6.25	7.553	5.943	39.62
M	3.13	.....	5.66	7.620	5.985	38.60
J	2.50	.....	5.56	7.557	5.927	38.23
J	2.75	.....	5.61	7.564	5.921	38.29
A	2.50	.....	5.44	7.557	5.906	38.52
S	2.70	.....	6.25	7.525	5.872	39.09
O	2.94	.....	5.81	7.456	5.809	38.96
N	3.00	.....	5.62	7.350	5.720	39.05
D	3.80	.....	6.00	7.338	5.703	39.10
1875						
J	2.75	.....	5.25	7.255	5.631	39.41
F	2.50	.....	5.19	7.214	5.595	39.27
M	3.95	.....	5.90	7.195	5.573	39.64
A	3.50	.....	5.44	7.105	5.499	40.06
M	2.75	.....	4.56	7.056	5.458	38.33
J	2.35	.....	4.55	7.091	5.480	37.62
J	2.50	.....	4.31	7.024	5.425	37.65
A	2.19	.....	4.94	7.006	5.410	37.80
S	2.35	.....	5.89	6.956	5.369	37.42
O	3.31	.....	6.31	6.998	5.400	36.90
N	4.00	.....	6.39	6.947	5.360	37.38
D	5.17	.....	6.61	6.867	5.299	37.38
1876						
J	5.83	.....	6.44	6.795	5.243	38.29
F	3.63	.....	5.33	6.722	5.188	38.87
M	3.75	.....	5.39	6.674	5.152	39.02
A	3.69	.....	5.50	6.705	5.177	37.48
M	3.20	.....	5.05	6.736	5.204	35.93
J	2.56	.....	4.75	6.699	5.178	35.60
J	2.06	.....	3.81	6.616	5.117	35.22
A	1.70	.....	3.60	6.575	5.089	33.65
S	1.94	.....	4.75	6.672	5.169	31.71
O	3.00	.....	5.67	6.675	5.175	31.39
N	3.85	.....	5.44	6.658	5.165	30.72
D	5.00	.....	5.88	6.652	5.165	30.55

INTEREST RATES AND STOCK PRICES

A147

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adjust. Bonds	6 Stock Prices
1877						
J	5.37	.....	5.55	6.607	5.135	30.29
F	3.31	.....	4.50	6.649	5.172	28.39
M	2.94	.....	4.44	6.737	5.247	27.05
A	3.69	.....	4.38	6.749	5.260	25.07
M	2.45	.....	4.00	6.690	5.220	24.99
J	1.75	.....	4.06	6.605	5.159	23.59
J	1.75	.....	4.14	6.538	5.112	24.39
A	3.40	.....	5.64	6.569	5.143	25.97
S	4.31	.....	6.38	6.588	5.164	27.70
O	6.10	.....	7.25	6.618	5.193	28.48
N	5.38	.....	6.19	6.596	5.182	27.97
D	6.00	.....	5.62	6.547	5.149	27.84
1878						
J	9.76	.....	5.85	6.543	5.152	27.84
F	4.75	.....	5.31	6.533	5.149	27.28
M	4.88	.....	5.12	6.534	5.156	27.75
A	6.18	.....	5.36	6.529	5.157	28.61
M	3.50	.....	4.53	6.486	5.127	28.62
J	2.56	.....	3.81	6.404	5.069	29.39
J	1.75	.....	3.60	6.399	5.069	29.91
A	1.81	.....	3.81	6.440	5.105	29.56
S	2.31	.....	4.62	6.431	5.103	30.20
O	5.00	.....	5.45	6.397	5.079	29.91
N	3.81	.....	5.12	6.349	5.043	29.80
D	4.38	.....	5.06	6.322	5.026	29.69
1879						
J	3.05	.....	4.33	6.188	4.922	31.15
F	3.06	.....	3.81	6.018	4.789	32.33
M	4.50	.....	5.06	6.118	4.869	31.66
A	4.40	.....	5.45	6.117	4.870	32.66
M	3.81	.....	4.44	5.974	4.758	34.33
J	3.31	.....	4.25	5.918	4.715	34.86
J	2.95	.....	3.90	5.864	4.673	35.46
A	7.85	.....	5.56	5.857	4.668	35.95
S	5.50	.....	5.78	5.961	4.751	37.25
O	12.34	.....	5.94	5.945	4.739	41.17
N	8.73	.....	6.25	5.921	4.720	43.29
D	5.80	.....	5.95	5.876	4.685	43.43
1880						
J	5.00	.....	5.38	5.824	4.643	45.26
F	4.63	.....	5.31	5.750	4.585	46.22
M	7.28	.....	5.50	5.734	4.571	46.97
A	6.55	.....	5.50	5.747	4.580	46.35
M	4.06	.....	5.19	5.736	4.572	42.59
J	3.00	.....	4.55	5.691	4.535	42.62
J	2.50	.....	4.44	5.600	4.463	44.61
A	2.50	.....	5.03	5.543	4.417	46.52
S	2.70	.....	5.25	5.505	4.486	46.49
O	2.88	.....	5.12	5.453	4.344	48.14
N	6.05	.....	5.44	5.326	4.243	51.12
D	11.20	.....	6.00	5.243	4.176	53.69

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adjust. Bonds	6 Stock Prices
1881						
J	4.81	.....	5.25	5.194	4.137	56.38
F	15.91	.....	5.38	5.249	4.181	55.77
M	7.48	.....	5.55	5.302	4.224	56.51
A	4.44	.....	5.19	5.283	4.209	56.21
M	3.38	.....	4.06	5.144	4.099	58.51
J	3.15	.....	3.50	5.064	4.036	59.00
J	3.44	.....	4.00	5.066	4.038	56.80
A	4.65	.....	4.95	5.106	4.071	55.74
S	5.25	.....	5.69	5.199	4.147	56.12
O	5.44	.....	6.25	5.250	4.189	55.25
N	5.20	.....	6.30	5.221	4.168	55.61
D	6.00	.....	6.25	5.250	4.192	54.03
1882						
J	5.43	.....	5.50	5.242	4.187	53.12
F	4.50	.....	5.47	5.273	4.214	51.89
M	4.65	.....	5.64	5.298	4.236	51.64
A	4.06	.....	5.06	5.240	4.192	51.60
M	3.00	.....	4.85	5.209	4.170	50.98
J	3.56	.....	5.12	5.212	4.174	50.68
J	3.00	.....	4.62	5.190	4.159	53.68
A	3.95	.....	5.65	5.226	4.190	55.36
S	7.25	.....	6.75	5.246	4.208	55.86
O	5.50	.....	6.67	5.232	4.200	54.46
N	7.80	.....	6.50	5.255	4.221	52.18
D	4.63	.....	5.88	5.250	4.219	52.50
1883						
J	4.50	.....	5.50	5.205	4.185	52.35
F	4.13	.....	5.38	5.241	4.217	51.05
M	10.38	.....	6.38	5.259	4.234	51.73
A	6.06	.....	5.81	5.233	4.216	52.95
M	3.55	.....	5.35	5.228	4.213	51.88
J	2.00	.....	5.50	5.223	4.211	52.36
J	2.13	.....	4.78	5.219	4.210	51.40
A	2.50	.....	5.61	5.258	4.243	49.11
S	2.44	.....	6.00	5.262	4.249	49.72
O	2.70	.....	6.00	5.249	4.240	48.45
N	2.00	.....	5.69	5.211	4.210	49.10
D	2.13	.....	5.50	5.185	4.192	48.13
1884						
J	1.90	.....	4.89	5.149	4.163	46.74
F	1.88	.....	4.75	5.095	4.120	48.01
M	1.75	.....	4.62	5.052	4.087	47.85
A	2.10	.....	4.72	5.021	4.063	46.04
M	14.98	.....	5.06	5.115	4.140	42.26
J	3.44	.....	5.75	5.238	4.239	39.20
J	1.90	.....	5.95	5.253	4.252	40.31
A	1.75	.....	5.50	5.171	4.187	42.77
S	1.75	.....	5.50	5.179	4.195	41.17
O	1.95	.....	5.50	5.172	4.190	39.84
N	1.44	.....	5.19	5.178	4.196	38.93
D	1.50	.....	5.00	5.133	4.159	38.95

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adjust. Bonds	6 Stock Prices
1885						
J	1.19	.....	4.69	5.076	4.113	38.12
F	1.44	.....	4.50	5.033	4.079	39.13
M	1.31	.....	4.47	4.987	4.042	39.29
A	1.35	.....	3.97	4.974	4.033	39.22
M	1.44	.....	3.68	4.953	4.017	38.63
J	1.19	.....	3.55	4.892	3.967	38.33
J	1.35	.....	3.50	4.856	3.939	39.98
A	1.50	.....	3.68	4.846	3.931	42.10
S	1.55	.....	3.75	4.829	3.918	41.55
O	2.13	.....	4.00	4.782	3.880	43.82
N	2.69	.....	4.44	4.749	3.853	46.61
D	2.75	.....	4.50	4.723	3.833	46.43
1886						
J	2.13	.....	4.31	4.643	3.768	46.64
F	2.06	.....	3.90	4.562	3.703	47.38
M	2.65	.....	3.87	4.546	3.690	46.60
A	2.38	.....	4.25	4.558	3.700	45.95
M	2.88	.....	4.06	4.554	3.697	45.10
J	3.35	.....	3.85	4.517	3.667	47.13
J	2.25	.....	3.94	4.482	3.638	47.84
A	5.31	.....	5.19	4.495	3.648	48.30
S	5.90	.....	5.81	4.562	3.703	49.45
O	5.06	.....	6.06	4.563	3.703	50.81
N	5.63	.....	5.92	4.562	3.702	51.88
D	8.70	.....	5.97	4.592	3.726	50.70
1887						
J	4.19	.....	5.50	4.564	3.703	50.11
F	3.56	.....	4.81	4.575	3.710	49.71
M	5.05	.....	5.35	4.595	3.725	50.85
A	6.13	.....	5.38	4.601	3.729	52.20
M	5.13	.....	5.21	4.586	3.715	53.06
J	7.20	.....	5.13	4.592	3.718	51.71
J	4.75	.....	6.19	4.615	3.735	50.38
A	5.15	.....	6.35	4.656	3.765	49.07
S	5.13	.....	6.94	4.745	3.835	48.43
O	4.19	.....	6.38	4.777	3.859	46.57
N	4.60	.....	5.75	4.734	3.821	47.26
D	5.00	.....	6.00	4.715	3.803	47.10
1888						
J	3.69	.....	5.60	4.643	3.742	47.32
F	2.70	.....	4.85	4.614	3.716	46.92
M	2.75	.....	5.22	4.638	3.732	45.16
A	2.63	.....	5.40	4.640	3.731	45.31
M	1.80	.....	4.82	4.620	3.712	45.88
J	1.50	.....	4.25	4.595	3.690	44.10
J	1.44	.....	4.08	4.541	3.644	45.40
A	1.55	.....	4.36	4.535	3.637	46.02
S	2.81	.....	5.28	4.572	3.664	47.32
O	2.60	.....	5.07	4.582	3.671	46.82
N	2.56	.....	4.75	4.564	3.655	45.39
D	4.13	.....	4.97	4.551	3.643	44.55

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adjust. Bonds	6 Stock Prices
1889						
J	3.30	.....	4.65	4.499	3.599	45.19
F	2.31	.....	4.25	4.445	3.555	45.56
M	3.06	.....	4.50	4.457	3.565	44.31
A	3.88	.....	4.29	4.448	3.557	44.05
M	2.55	.....	3.85	4.396	3.516	45.21
J	3.00	.....	3.88	4.347	3.476	45.71
J	3.55	.....	4.40	4.372	3.496	44.54
A	3.88	.....	5.16	4.383	3.506	45.63
S	4.81	.....	5.28	4.388	3.512	47.20
O	8.30	.....	6.00	4.437	3.551	46.74
N	7.13	.....	6.00	4.475	3.583	46.68
D	8.00	.....	6.09	4.491	3.597	46.47
1890						
J	7.70	4.80	5.35	4.472	3.584	46.93
F	4.25	4.94	5.03	4.474	3.588	46.45
M	4.25	5.06	5.50	4.494	3.607	46.14
A	4.30	4.50	5.11	4.495	3.611	47.14
M	4.88	5.20	5.06	4.494	3.613	49.03
J	4.75	5.00	5.00	4.512	3.632	48.63
J	4.60	4.85	5.05	4.525	3.645	48.14
A	11.63	6.00	5.59	4.564	3.681	46.96
S	6.75	6.25	5.75	4.590	3.705	46.07
O	5.00	6.00	5.90	4.618	3.733	43.96
N	7.00	7.00	6.75	4.676	3.784	41.11
D	5.00	7.00	7.33	4.732	3.832	40.45
1891						
J	3.90	5.22	5.83	4.622	3.747	42.32
F	2.88	4.38	5.00	4.619	3.750	42.72
M	2.88	4.75	5.25	4.677	3.800	41.76
A	3.30	4.20	5.08	4.691	3.816	43.34
M	4.38	5.58	5.38	4.727	3.849	43.30
J	3.25	4.50	5.50	4.789	3.901	42.30
J	2.20	4.55	5.60	4.782	3.899	41.81
A	2.13	5.56	5.75	4.781	3.901	43.59
S	4.50	5.78	5.78	4.755	3.883	47.45
O	4.25	5.39	5.58	4.709	3.848	47.47
N	4.38	5.00	5.06	4.675	3.823	46.50
D	2.94	4.40	4.83	4.629	3.789	48.06
1892						
J	2.40	3.31	4.16	4.577	3.749	48.62
F	2.00	3.12	3.69	4.547	3.726	48.53
M	2.00	3.55	3.98	4.554	3.734	49.14
A	2.00	2.88	3.47	4.533	3.720	48.85
M	1.50	2.62	3.16	4.508	3.701	48.68
J	1.40	2.70	2.95	4.492	3.689	48.26
J	1.88	3.00	3.47	4.477	3.679	48.32
A	2.05	2.95	3.96	4.486	3.687	48.64
S	4.13	4.50	4.71	4.531	3.725	47.08
O	5.63	5.50	5.16	4.529	3.724	47.93
N	5.15	5.38	5.14	4.538	3.732	47.39
D	6.81	5.50	5.50	4.556	3.746	46.84

INTEREST RATES AND STOCK PRICES

A151

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adjust. Bonds	6 Stock Prices
1893						
J	4.00	4.88	5.10	4.531	3.726	47.70
F	3.00	4.12	4.97	4.498	3.697	46.71
M	8.20	5.90	6.80	4.534	3.727	45.12
A	4.88	5.90	5.75	4.539	3.731	45.42
M	3.60	5.86	6.69	4.594	3.775	42.14
J	8.88	6.08	8.47	4.670	3.836	40.17
J	7.75	8.75	10.88	4.824	3.962	36.58
A	5.50	7.40	10.60	4.940	4.056	35.85
S	3.75	5.75	8.28	4.789	3.930	37.85
O	2.38	4.88	5.91	4.726	3.878	38.47
N	1.70	3.40	4.38	4.622	3.791	39.22
D	1.16	2.62	3.66	4.554	3.734	38.08
1894						
J	1.02	2.61	3.48	4.547	3.727	37.31
F	1.00	2.56	3.30	4.493	3.681	37.80
M	1.09	2.50	3.03	4.452	3.648	38.90
A	1.13	2.50	3.10	4.403	3.606	39.22
M	1.10	2.00	2.93	4.408	3.607	37.63
J	1.00	1.88	2.91	4.413	3.611	36.95
J	1.00	2.00	3.00	4.430	3.623	36.33
A	1.00	2.45	3.07	4.405	3.602	37.68
S	1.00	2.38	3.28	4.374	3.576	38.53
O	1.00	2.00	2.76	4.334	3.542	37.32
N	1.03	2.39	2.79	4.303	3.516	37.22
D	1.44	2.38	2.88	4.302	3.514	36.77
1895						
J	1.35	2.55	3.10	4.310	3.520	36.26
F	1.50	3.19	3.62	4.351	3.551	35.73
M	2.25	3.38	3.91	4.367	3.562	35.45
A	2.25	3.41	3.97	4.374	3.566	36.93
M	1.32	2.40	2.77	4.318	3.519	38.86
J	1.16	2.00	2.62	4.251	3.462	39.77
J	1.40	2.39	2.94	4.220	3.435	40.42
A	1.03	2.50	3.47	4.170	3.392	41.05
S	1.56	2.69	4.03	4.177	3.396	41.38
O	2.17	2.85	4.78	4.189	3.404	40.85
N	1.97	2.50	4.13	4.208	3.418	39.50
D	4.56	4.12	4.75	4.271	3.467	37.14
1896						
J	4.90	6.00	6.00	4.331	3.515	36.62
F	3.94	5.25	5.81	4.284	3.475	38.10
M	3.50	3.88	5.22	4.289	3.479	37.29
A	3.02	3.70	5.27	4.286	3.475	37.67
M	2.53	3.12	4.53	4.266	3.456	37.51
J	1.94	3.12	4.25	4.253	3.445	37.00
J	2.07	3.90	5.05	4.349	3.521	34.90
A	4.69	7.50	7.81	4.555	3.687	33.07
S	5.45	7.89	8.30	4.477	3.622	34.54
O	11.13	8.44	8.36	4.434	3.587	35.22
N	6.25	4.81	5.34	4.326	3.499	37.18
D	1.95	3.10	3.73	4.275	3.456	36.18

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adjust. Bonds	6 Stock Prices
1897						
J	1.78	2.62	3.31	4.222	3.413	36.09
F	1.63	2.50	3.00	4.194	3.389	35.65
M	1.62	2.83	3.33	4.135	3.342	35.81
A	1.50	2.50	3.53	4.147	3.350	34.68
M	1.41	2.50	3.53	4.131	3.338	34.84
J	1.20	2.22	3.12	4.095	3.308	36.45
J	1.19	2.00	3.40	4.059	3.279	37.85
A	1.25	2.69	3.72	4.080	3.296	40.39
S	2.22	3.20	4.10	4.090	3.304	42.21
O	2.50	3.19	4.19	4.092	3.305	41.13
N	1.81	3.00	3.38	4.072	3.289	39.73
D	2.92	3.40	3.42	4.019	3.247	40.77
1898						
J	2.50	2.88	3.25	3.996	3.228	41.72
F	1.78	2.69	3.12	4.000	3.233	41.52
M	2.17	4.60	4.65	4.093	3.308	39.63
A	2.97	5.81	5.75	4.189	3.386	38.77
M	1.95	3.72	4.65	4.145	3.351	41.16
J	1.25	2.78	3.24	4.083	3.302	42.66
J	1.25	2.56	3.66	4.033	3.262	42.67
A	1.70	2.95	3.64	4.002	3.238	44.47
S	3.78	3.69	4.11	4.021	3.254	44.65
O	2.25	2.69	3.41	3.989	3.229	43.78
N	2.10	2.90	3.30	3.949	3.197	44.73
D	2.41	3.00	3.03	3.911	3.168	47.26
1899						
J	2.72	2.89	2.90	3.859	3.127	51.25
F	2.47	3.03	3.05	3.864	3.132	53.25
M	4.10	4.00	3.86	3.865	3.134	53.07
A	5.13	3.88	3.69	3.826	3.103	53.81
M	3.52	3.19	3.60	3.793	3.078	51.90
J	2.63	3.00	3.31	3.783	3.071	51.14
J	4.47	3.62	3.66	3.803	3.089	53.08
A	3.27	4.20	4.35	3.824	3.107	54.30
S	6.38	5.56	4.94	3.859	3.138	53.69
O	7.50	5.35	5.19	3.897	3.170	53.42
N	7.60	5.96	5.42	3.918	3.190	54.52
D	11.13	6.12	5.88	3.960	3.226	51.78
1900						
J	4.15	4.80	4.93	3.923	3.197	52.30
F	2.25	4.25	4.40	3.889	3.172	53.43
M	3.94	4.56	4.88	3.875	3.164	54.77
A	3.06	3.50	4.25	3.856	3.150	55.79
M	2.00	3.00	3.70	3.886	3.178	53.57
J	1.69	3.06	3.68	3.900	3.192	52.23
J	1.53	3.36	4.03	3.898	3.192	51.95
A	1.30	3.61	4.19	3.897	3.194	52.45
S	1.61	3.88	4.34	3.898	3.199	51.53
O	3.57	4.95	5.05	3.898	3.202	53.29
N	5.06	4.33	4.40	3.870	3.183	56.90
D	5.13	4.78	4.75	3.838	3.160	61.06

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adjust. Bonds	6 Stock Prices
1901						
J	3.07	3.83	4.03	3.824	3.152	63.93
F	2.00	3.25	3.69	3.804	3.140	66.01
M	2.34	3.28	3.75	3.801	3.141	68.29
A	4.30	4.14	3.97	3.808	3.151	74.36
M	6.88	4.36	3.97	3.835	3.178	71.47
J	4.31	3.56	3.94	3.821	3.172	78.33
J	4.30	4.33	4.30	3.838	3.190	72.17
A	2.44	4.38	4.50	3.853	3.208	73.93
S	4.34	5.06	4.94	3.858	3.217	74.44
O	3.55	4.65	4.65	3.854	3.219	74.84
N	4.19	4.69	4.72	3.825	3.200	77.86
D	6.25	5.19	4.94	3.824	3.205	76.72
1902						
J	4.57	4.53	4.50	3.810	3.198	77.94
F	2.38	4.00	4.00	3.801	3.197	78.52
M	3.94	4.00	4.34	3.799	3.201	78.62
A	5.10	4.25	4.48	3.791	3.200	81.64
M	5.56	4.75	4.53	3.804	3.217	81.95
J	2.84	4.35	4.44	3.818	3.234	82.25
J	3.52	4.60	4.62	3.833	3.252	85.32
A	3.78	4.72	4.84	3.848	3.271	87.91
S	10.80	7.83	5.61	3.863	3.290	88.01
O	7.63	7.44	5.94	3.897	3.325	85.11
N	4.88	6.44	5.75	3.906	3.339	81.89
D	6.81	6.80	6.00	3.928	3.364	80.29
1903						
J	5.75	4.97	5.12	3.918	3.362	84.23
F	2.88	4.59	4.48	3.932	3.380	82.75
M	6.00	5.63	5.61	3.978	3.427	78.98
A	4.19	4.96	5.22	4.011	3.462	75.56
M	2.44	3.92	4.75	3.991	3.451	74.35
J	3.05	4.28	5.08	4.024	3.486	70.38
J	2.50	4.58	5.44	4.070	3.532	68.43
A	2.03	4.91	5.94	4.115	3.578	66.42
S	2.32	5.25	6.00	4.118	3.586	65.50
O	2.69	5.00	5.84	4.074	3.554	64.09
N	5.19	5.81	5.97	4.040	3.530	64.35
D	5.50	5.23	5.85	4.047	3.542	66.84
1904						
J	2.34	4.03	4.88	4.035	3.537	67.85
F	1.81	3.69	4.78	4.044	3.550	65.83
M	1.75	3.17	4.68	4.056	3.565	65.75
A	1.38	2.69	4.06	4.032	3.549	67.44
M	1.55	2.61	3.92	4.016	3.539	65.74
J	1.13	2.31	3.61	3.992	3.522	66.03
J	1.03	2.44	3.53	3.953	3.491	69.08
A	0.90	2.35	3.88	3.941	3.484	71.42
S	1.53	3.25	4.31	3.944	3.490	74.64
O	2.03	3.50	4.40	3.936	3.487	78.91
N	2.80	3.75	4.13	3.926	3.480	82.25
D	3.13	3.59	4.28	3.915	3.473	83.53

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adjust. Bonds	6 Stock Prices
1905						
J	2.25	2.93	3.97	3.885	3.449	86.05
F	2.19	3.10	3.83	3.874	3.441	90.39
M	3.20	3.24	3.93	3.886	3.453	93.01
A	3.25	3.44	3.97	3.893	3.461	91.58
M	2.42	3.18	3.98	3.899	3.467	87.13
J	2.50	3.07	3.75	3.894	3.464	88.72
J	2.31	3.09	4.12	3.882	3.455	91.53
A	2.05	3.28	4.20	3.885	3.458	95.46
S	3.56	4.28	4.72	3.886	3.459	96.30
O	5.31	4.90	4.95	3.887	3.460	97.38
N	7.70	5.71	5.58	3.912	3.483	96.18
D	16.50	6.00	5.81	3.923	3.491	96.94
1906						
J	8.65	5.08	5.05	3.912	3.482	99.84
F	4.63	5.25	5.03	3.932	3.499	99.42
M	4.88	5.22	5.28	3.966	3.529	97.61
A	9.50	5.69	5.44	3.986	3.545	96.25
M	4.15	4.95	5.32	4.003	3.559	93.78
J	3.25	4.38	5.25	3.990	3.547	95.57
J	2.97	4.50	5.46	4.005	3.558	93.73
A	4.44	5.39	5.96	4.027	3.576	100.85
S	9.38	7.19	6.56	4.056	3.600	103.95
O	5.15	6.13	6.30	4.045	3.588	102.91
N	7.50	7.19	6.25	4.038	3.581	102.46
D	14.00	7.88	6.25	4.054	3.594	101.57
1907						
J	6.15	5.78	6.15	4.065	3.602	98.16
F	4.38	5.25	5.94	4.088	3.621	94.50
M	6.38	6.22	6.18	4.159	3.683	85.02
A	2.35	4.42	5.94	4.159	3.681	85.58
M	2.31	3.97	5.47	4.181	3.700	82.88
J	3.13	4.44	5.44	4.233	3.745	80.67
J	4.55	5.10	5.75	4.231	3.742	83.71
A	3.06	6.41	6.25	4.286	3.791	78.97
S	4.00	5.72	6.81	4.340	3.840	79.01
O	21.00	8.05	7.10	4.419	3.909	72.08
N	12.25	13.50	7.25	4.590	4.062	67.87
D	14.60	10.00	7.83	4.474	3.959	71.03
1908						
J	4.75	5.36	6.47	4.316	3.820	73.71
F	1.81	4.22	5.06	4.302	3.810	70.93
M	1.85	3.57	5.68	4.335	3.841	72.98
A	1.72	2.85	4.46	4.303	3.814	76.37
M	1.66	2.91	3.94	4.261	3.779	80.74
J	1.52	2.32	3.64	4.255	3.777	80.93
J	1.22	2.29	3.75	4.230	3.757	83.18
A	1.06	2.56	3.60	4.185	3.720	85.95
S	1.35	2.57	3.93	4.151	3.693	85.40
O	1.44	3.10	4.06	4.140	3.686	86.41
N	1.75	3.31	4.03	4.102	3.657	91.76
D	2.90	3.20	3.85	4.083	3.643	94.28

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adjust. Bonds	6 Stock Prices
1909						
J	1.81	2.66	3.72	4.058	3.625	95.52
F	2.25	2.78	3.53	4.031	3.605	93.55
M	1.85	2.65	3.50	4.042	3.620	94.98
A	1.94	2.47	3.50	4.046	3.627	98.63
M	1.84	2.60	3.44	4.041	3.628	100.81
J	1.87	2.55	3.25	4.058	3.648	102.21
J	2.06	2.38	3.38	4.052	3.648	103.88
A	2.17	3.29	4.04	4.063	3.662	105.83
S	2.69	3.74	4.18	4.083	3.685	105.29
O	4.31	4.75	5.03	4.097	3.702	105.01
N	4.65	4.86	5.05	4.111	3.719	103.10
D	5.03	4.64	5.11	4.116	3.727	104.45
1910						
J	4.72	4.31	4.75	4.116	3.732	102.59
F	2.78	3.69	4.44	4.121	3.739	99.40
M	2.88	3.90	4.50	4.140	3.761	101.71
A	3.28	4.09	4.75	4.183	3.804	99.66
M	3.63	3.93	4.75	4.201	3.824	98.32
J	2.77	3.40	4.92	4.218	3.842	93.56
J	2.41	3.96	5.38	4.240	3.866	88.91
A	1.55	3.78	5.43	4.232	3.863	90.79
S	2.00	4.22	5.53	4.183	3.820	91.21
O	3.13	4.78	5.56	4.158	3.801	95.00
N	3.23	4.50	5.50	4.187	3.830	94.10
D	3.38	3.91	4.66	4.184	3.829	91.83
1911						
J	3.18	3.38	3.99	4.174	3.823	94.25
F	2.28	3.14	4.06	4.177	3.827	95.43
M	2.28	2.86	3.90	4.191	3.842	94.45
A	2.30	2.75	3.65	4.186	3.840	94.34
M	2.31	2.78	3.62	4.173	3.829	95.95
J	2.40	2.81	3.68	4.182	3.839	98.23
J	2.36	2.88	3.78	4.187	3.844	98.17
A	2.31	3.20	4.19	4.200	3.857	93.71
S	2.28	3.50	4.53	4.217	3.873	89.02
O	2.33	3.62	4.36	4.209	3.866	90.37
N	2.72	3.62	3.94	4.188	3.847	93.80
D	4.03	4.12	4.62	4.195	3.853	93.37
1912						
J	2.42	2.95	3.90	4.187	3.846	93.20
F	2.28	2.89	3.75	4.178	3.837	92.31
M	2.42	3.44	4.19	4.195	3.852	94.17
A	3.03	3.50	4.14	4.204	3.860	96.46
M	2.75	3.19	4.19	4.210	3.865	95.70
J	2.75	3.12	4.00	4.224	3.876	95.25
J	2.88	3.58	4.52	4.234	3.885	95.28
A	2.84	4.10	5.00	4.257	3.905	97.65
S	4.63	5.50	5.56	4.279	3.923	97.62
O	5.33	5.75	5.93	4.276	3.919	97.10
N	6.38	5.88	5.72	4.275	3.917	96.42
D	6.50	5.87	6.00	4.291	3.931	93.78

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adjust. Bonds	6 Stock Prices
1913						
J	3.01	4.11	4.81	4.276	3.916	93.22
F	3.31	4.53	4.90	4.292	3.930	90.75
M	4.19	5.37	5.76	4.362	3.992	88.94
A	3.43	4.30	5.52	4.413	4.037	88.76
M	2.75	3.94	5.35	4.464	4.083	86.25
J	2.28	4.13	5.88	4.512	4.127	82.31
J	2.22	4.54	6.04	4.510	4.124	83.35
A	2.25	4.50	6.00	4.467	4.083	84.64
S	2.89	4.62	5.81	4.427	4.045	84.96
O	3.61	5.04	5.66	4.464	4.078	82.94
N	3.75	4.94	5.56	4.521	4.128	81.08
D	4.58	5.03	5.69	4.533	4.138	80.88
1914						
J	2.57	3.67	4.53	4.451	4.062	83.38
F	1.78	3.03	3.85	4.383	3.998	83.99
M	1.90	3.00	3.84	4.405	4.016	81.68
A	1.82	2.81	3.74	4.405	4.014	79.77
M	1.78	2.44	3.88	4.406	4.012	80.28
J	1.85	2.54	3.86	4.394	4.000	79.85
J	2.74	3.66	4.44	4.441	4.041	75.72
A	6.25	7.63	6.34	*	*	*
S	6.00	6.90	6.70	*	*	*
O	6.00	6.50	6.44	*	*	*
N	5.41	5.22	5.50	*	*	*
D	3.38	3.87	4.35	4.657	4.225	72.13
1915						
J	2.13	3.19	3.85	4.595	4.166	73.23
F	1.97	2.88	3.75	4.590	4.158	71.96
M	1.93	2.85	3.38	4.624	4.187	73.25
A	2.09	2.91	3.66	4.580	4.145	77.17
M	1.94	2.84	3.72	4.591	4.152	75.09
J	1.83	2.70	3.65	4.627	4.182	74.54
J	1.85	2.78	3.25	4.697	4.243	72.84
A	1.76	2.81	3.53	4.733	4.274	75.04
S	1.79	2.75	3.28	4.748	4.285	77.00
O	1.82	2.75	3.22	4.647	4.192	81.16
N	1.88	2.72	2.99	4.507	4.064	84.70
D	1.93	2.58	3.09	4.492	4.048	84.05
1916						
J	1.88	2.75	3.12	4.476	4.032	82.63
F	1.88	2.76	3.12	4.464	4.019	80.75
M	1.90	2.82	3.12	4.480	4.032	80.29
A	2.10	2.88	3.12	4.499	4.047	79.74
M	2.28	2.88	3.12	4.510	4.055	81.95
J	2.97	3.50	3.62	4.516	4.060	83.27
J	3.13	3.97	3.97	4.530	4.070	82.38
A	2.33	3.23	3.72	4.550	4.086	81.77
S	2.78	3.32	3.38	4.537	4.074	83.03
O	2.63	3.36	3.38	4.479	4.020	85.17
N	3.04	3.42	3.49	4.441	3.984	84.53
D	4.44	4.25	3.91	4.443	3.985	82.91

*Stock Exchange closed.

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adj. Bonds	6 Stock Prices
1917						
J	2.05	3.13	3.55	4.376	3.923	81.32
F	2.41	4.06	4.09	4.450	3.988	77.04
M	2.28	3.75	4.12	4.495	4.026	77.99
A	2.47	3.97	4.28	4.601	4.121	77.14
M	3.07	4.42	4.83	4.731	4.236	74.00
J	4.69	4.91	5.00	4.784	4.282	74.96
J	3.35	4.32	4.68	4.831	4.322	74.03
A	2.99	4.49	4.79	4.867	4.354	72.96
S	4.53	5.50	5.18	4.964	4.440	69.88
O	4.00	5.57	5.38	5.016	4.486	66.85
N	4.17	5.44	5.44	5.162	4.615	61.80
D	5.16	5.56	5.50	5.252	4.695	59.74
1918						
J	4.10	5.65	5.57	5.215	4.661	62.37
F	4.99	5.81	5.68	5.162	4.612	63.12
M	5.20	6.00	5.88	5.233	4.676	62.63
A	4.22	6.00	5.91	5.297	4.732	61.39
M	5.03	6.00	5.88	5.223	4.664	63.37
J	5.00	5.78	5.88	5.283	4.718	63.74
J	5.63	5.72	5.88	5.345	4.773	63.96
A	5.88	5.91	5.94	5.347	4.773	65.51
S	6.00	6.00	6.00	5.405	4.824	65.89
O	6.00	6.00	6.00	5.274	4.705	68.60
N	5.85	6.00	5.97	4.957	4.422	70.32
D	5.39	5.68	5.81	4.979	4.440	67.51
1919						
J	4.78	5.18	5.25	5.077	4.527	65.84
F	5.06	5.31	5.18	5.126	4.570	65.86
M	4.88	5.50	5.38	5.189	4.625	66.54
A	5.40	5.80	5.38	5.239	4.669	66.77
M	5.25	5.50	5.38	5.186	4.620	70.41
J	6.63	5.78	5.53	5.185	4.617	70.55
J	6.55	6.00	5.43	5.253	4.676	70.26
A	5.13	5.94	5.38	5.435	4.837	65.77
S	5.78	5.88	5.38	5.477	4.874	64.52
O	7.94	6.18	5.38	5.333	4.746	65.26
N	11.06	6.50	5.50	5.473	4.869	63.18
D	8.85	6.60	5.88	5.538	4.927	60.42
1920						
J	8.19	7.31	6.00	5.517	4.907	60.59
F	10.00	8.12	6.40	5.706	5.073	58.14
M	8.09	8.15	6.67	5.705	5.073	61.64
A	7.29	8.12	6.82	5.923	5.265	59.44
M	7.15	8.25	7.16	6.172	5.487	57.29
J	7.50	8.10	7.72	6.121	5.443	56.80
J	8.29	8.28	7.84	6.085	5.411	57.58
A	7.23	8.72	8.00	5.899	5.247	59.50
S	7.10	8.22	7.97	5.692	5.063	63.09
O	7.75	7.94	8.00	5.513	4.905	65.89
N	7.90	7.76	7.93	5.603	4.987	64.00
D	7.00	7.32	7.88	5.784	5.149	58.11

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adjust. Bonds	6 Stock Prices
1921						
J	6.71	6.60	7.82	5.584	4.974	59.77
F	7.26	6.81	7.75	5.608	4.997	59.02
M	6.82	6.75	7.62	5.672	5.057	56.25
A	6.45	6.66	7.56	5.707	5.091	55.17
M	6.79	6.65	6.93	5.722	5.109	57.43
J	6.00	6.68	6.71	5.862	5.238	53.97
J	5.60	6.12	6.28	5.707	5.103	56.25
A	5.57	5.98	5.95	5.611	5.021	57.23
S	5.14	5.59	5.88	5.525	4.949	57.86
O	5.28	5.38	5.62	5.502	4.933	56.93
N	5.03	5.20	5.17	5.266	4.726	58.54
D	5.14	5.12	5.12	5.110	4.591	58.62
1922						
J	4.55	4.75	4.91	5.011	4.506	58.36
F	4.90	4.87	4.88	5.013	4.513	60.35
M	4.23	4.74	4.79	4.966	4.475	62.65
A	3.97	4.41	4.56	4.870	4.393	65.80
M	3.91	4.17	4.28	4.840	4.372	67.11
J	3.70	4.12	4.03	4.833	4.370	66.44
J	3.86	4.06	3.94	4.740	4.291	68.99
A	3.76	4.08	3.88	4.690	4.251	72.30
S	4.34	4.47	4.19	4.674	4.242	73.30
O	4.73	4.79	4.39	4.793	4.355	73.21
N	4.89	4.99	4.61	4.879	4.439	69.24
D	4.66	4.91	4.62	4.862	4.429	67.62
1923						
J	4.32	4.67	4.62	4.857	4.431	67.56
F	4.82	4.91	4.68	4.890	4.467	69.72
M	5.14	5.28	5.03	5.024	4.595	70.04
A	4.87	5.32	5.12	5.050	4.625	68.98
M	4.70	5.07	5.12	4.967	4.555	66.47
J	5.00	4.91	4.91	4.983	4.576	65.85
J	5.06	5.12	4.95	4.991	4.590	63.24
A	4.97	5.24	5.03	4.960	4.568	62.89
S	4.93	5.47	5.12	5.000	4.610	63.17
O	4.76	5.28	5.12	5.019	4.633	62.66
N	4.81	5.03	5.09	4.982	4.605	63.62
D	4.86	5.00	4.88	4.994	4.623	63.58
1924						
J	4.39	4.80	4.88	4.949	4.586	64.52
F	4.33	4.75	4.78	4.965	4.606	65.06
M	4.04	4.69	4.62	4.968	4.613	64.60
A	4.21	4.33	4.62	4.930	4.584	65.46
M	3.34	3.97	4.19	4.878	4.538	65.58
J	2.25	3.31	3.97	4.804	4.475	67.42
J	2.10	2.85	3.52	4.742	4.422	70.71
A	2.00	2.72	3.25	4.782	4.463	72.53
S	2.07	2.96	3.12	4.775	4.461	72.03
O	2.32	2.88	3.12	4.749	4.440	71.27
N	2.42	3.12	3.22	4.753	4.448	76.15
D	3.49	3.55	3.55	4.787	4.484	80.10

INTEREST RATES AND STOCK PRICES

A159

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adjust. Bonds	6 Stock Prices
1925						
J	3.32	3.62	3.62	4.776	4.478	80.79
F	3.60	3.65	3.62	4.759	4.466	80.93
M	3.97	4.07	3.91	4.741	4.452	78.63
A	3.86	4.01	3.93	4.724	4.440	76.46
M	3.82	3.78	3.88	4.667	4.390	78.49
J	3.97	3.85	3.88	4.670	4.396	78.89
J	4.09	3.93	3.90	4.716	4.444	79.68
A	4.19	4.35	3.97	4.772	4.500	82.32
S	4.62	4.41	4.15	4.728	4.462	83.17
O	4.87	4.82	4.38	4.744	4.479	84.34
N	4.74	4.91	4.38	4.725	4.465	86.78
D	5.32	4.99	4.38	4.687	4.432	90.59
1926						
J	4.33	4.78	4.35	4.645	4.395	90.66
F	4.85	4.64	4.15	4.609	4.364	89.09
M	4.55	4.74	4.28	4.614	4.372	85.33
A	4.06	4.22	4.19	4.554	4.318	85.84
M	3.81	4.06	4.03	4.516	4.285	86.75
J	4.15	4.13	3.88	4.517	4.288	90.29
J	4.27	4.36	3.94	4.542	4.315	92.09
A	4.52	4.66	4.22	4.555	4.331	94.67
S	5.02	4.91	4.49	4.550	4.329	97.49
O	4.75	4.99	4.53	4.543	4.325	94.54
N	4.56	4.68	4.43	4.502	4.289	95.24
D	5.16	4.67	4.40	4.485	4.278	97.05
1927						
J	4.32	4.55	4.19	4.454	4.251	98.36
F	4.03	4.42	3.91	4.452	4.253	102.61
M	4.13	4.42	4.00	4.411	4.217	103.69
A	4.18	4.38	4.09	4.355	4.168	106.14
M	4.26	4.36	4.12	4.347	4.165	108.47
J	4.33	4.40	4.12	4.380	4.200	110.22
J	4.05	4.44	4.06	4.384	4.209	112.10
A	3.68	4.08	3.90	4.342	4.174	113.47
S	3.80	4.17	3.91	4.305	4.143	115.39
O	3.90	4.34	4.00	4.257	4.101	115.15
N	3.60	4.15	3.93	4.206	4.057	114.23
D	4.38	4.19	3.97	4.183	4.040	116.58
1928						
J	4.24	4.35	3.88	4.187	4.049	114.79
F	4.38	4.55	3.99	4.208	4.073	111.84
M	4.47	4.61	4.19	4.213	4.082	115.66
A	5.08	4.88	4.31	4.231	4.104	120.49
M	5.70	5.17	4.55	4.275	4.151	122.41
J	6.32	5.76	4.72	4.371	4.249	116.52
J	6.05	5.93	5.09	4.437	4.317	114.85
A	6.87	6.34	5.42	4.496	4.377	116.57
S	7.26	7.06	5.59	4.442	4.329	119.60
O	6.98	7.10	5.51	4.435	4.322	118.42
N	6.67	6.88	5.38	4.395	4.287	124.37
D	8.60	7.47	5.44	4.468	4.360	124.91

TABLE 10 (Continued)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adjust. Bonds	6 Stock Prices
1929						
J	7.05	7.65	5.50	4.501	4.393	130.53
F	7.06	7.69	5.56	4.548	4.434	128.95
M	9.10	7.97	5.69	4.599	4.464	128.54
A	8.89	8.72	5.88	4.579	4.460	126.90
M	8.91	8.77	6.00	4.597	4.477	128.40
J	7.70	8.10	6.00	4.649	4.520	133.56
J	9.23	7.84	6.00	4.670	4.546	146.61
A	8.23	8.87	6.08	4.662	4.512	152.76
S	8.50	8.94	6.12	4.694	4.575	154.42
O	6.43	7.80	6.12	4.638	4.540	135.68
N	5.44	5.50	5.41	4.581	4.445	122.20
D	4.83	4.82	5.00	4.504	4.398	125.02
1930						
J	4.64	4.70	4.90	4.504	4.386	124.18
F	4.32	4.65	4.62	4.522	4.375	130.53
M	3.69	4.12	4.10	4.437	4.300	131.34
A	4.00	4.12	3.88	4.454	4.352	128.76
M	3.12	3.54	3.68	4.441	4.319	122.54
J	2.62	2.90	3.44	4.417	4.287	115.09
J	2.20	2.78	3.15	4.375	4.237	115.01
A	2.21	2.62	3.00	4.317	4.176	111.95
S	2.19	2.59	3.00	4.262	4.116	109.98
O	2.00	2.45	3.00	4.292	4.096	101.77
N	2.00	2.18	2.97	4.366	4.138	93.31
D	2.23	2.24	2.85	4.488	4.200	85.38
1931						
J	1.57	2.10	2.82	4.322	4.078	90.69
F	1.50	1.88	2.50	4.324	4.083	96.12
M	1.55	2.12	2.53	4.319	4.095	89.89
A	1.52	2.12	2.40	4.365	4.081	79.92
M	1.45	1.66	2.12	4.331	4.002	70.56
J	1.50	1.41	2.12	4.364	4.016	67.78
J	1.50	1.42	1.95	4.362	4.009	69.26
A	1.50	1.50	1.88	4.462	4.056	61.25
S	1.50	1.69	1.88	4.732	4.120	51.47
O	2.10	3.19	3.35	5.146	4.350	45.18
N	2.50	3.53	4.00	5.248	4.492	41.08
D	2.70	3.40	4.00	5.886	4.736	31.78
1932						
J	2.65	3.56	4.00	5.637	4.735	32.01
F	2.50	3.62	3.88	5.636	4.793	31.86
M	2.50	3.13	3.52	5.524	4.691	29.44
A	2.50	2.69	3.38	5.906	4.837	21.27
M	2.50	1.59	3.00	6.362	4.848	15.57
J	2.50	1.50	2.78	6.513	4.898	13.46
J	2.08	1.44	2.56	6.077	4.798	15.87
A	2.00	1.38	2.18	5.458	4.540	25.67
S	2.00	1.26	2.12	5.286	4.456	31.23
O	1.35	.97	1.94	5.319	4.456	26.16
N	1.00	.50	1.74	5.443	4.488	24.37
D	1.00	.50	1.51	5.557	4.375	23.26

TABLE 10 (Concluded)

Date	1 Call Money	2 Time Money	3 Coml. Paper	4 Unadj. Bonds	5 Adjust. Bonds	6 Stock Prices
1933						
J	1.00	.50	1.38	5.290	4.174	25.14
F	1.00	.66	1.38	5.390	4.173	23.81
M	3.32	2.94	2.78	5.681	4.337	23.75
A	1.37	1.25	2.56	5.907	4.515	25.46
M	1.00	1.04	2.08	5.485	4.357	34.64
J	1.00	.93	1.69	5.162	4.205	40.36
J	1.00	1.16	1.50	4.964	4.128	45.93
A	.98	1.08	1.50	4.921	4.076	45.56
S	.75	.64	1.25	5.159	4.100	42.99
O	.75	.69	1.25	5.185	4.111	35.50
N	.75	.83	1.25	5.576	4.240	35.40
D	.94	1.09	1.41	5.417	4.200	37.34
1934						
J	1.00	1.09	1.25	4.997	4.084	41.68
F	1.00	.91	1.22	4.695	3.996	46.05
M	1.00	.88	1.00	4.597	3.926	44.37
A	1.00	.88	1.00	4.515	3.865	44.87
M	1.00	.88	.90	4.467	3.812	40.31
J	1.00	.88	.75	4.402	3.728	40.32
J	1.00	.88	.75	4.379	3.721	35.93
A	1.00	.88	.75	4.494	3.771	32.82
S	1.00	.88	.75	4.592	3.826	32.08
O	1.00	.88	.75	4.491	3.762	32.95
N	1.00	.88	.75	4.401	3.680	32.53
D	1.00	.88	.75	4.307	3.611	33.47
1935						
J	1.00	.88	.75	4.209	3.523	32.39
F	1.00	.88	.75	4.148	3.438	30.55
M	1.00	.88	.75	4.225	3.409	26.73
A	.64	.56	.75	4.262	3.411	27.54
M	.25	.25	.75	4.206	3.438	29.05
J	.25	.25	.75	4.173	3.417	30.10
J	.25	.25	.75	4.129	3.397	31.71
A	.25	.25	.75	4.178	3.451	33.52
S	.25	.25	.75	4.214	3.467	34.10
O	.29	.34	.75	4.243	3.479	32.00
N	.75	1.00	.75	4.232	3.443	35.61
D	.75	1.00	.75	4.612	3.414	38.36
1936						
J	.75	1.00	.75	4.047	3.360	41.38
F	.75	1.00	.75	3.941	3.312	46.59
M	.75	1.00	.75	3.882	3.251	45.55
A	.75	1.00	.75	3.905	3.245	43.51
M	.93	1.19	.75	3.895	3.215	42.08
J	1.00	1.25	.75	3.875	3.200	44.26
J	1.00	1.25	.75	3.881	3.220	47.52
A	1.00	1.25	.75	3.877	3.240	50.10
S	1.00	1.25	.75	3.843	3.211	51.37
O	1.00	1.25	.75	3.828	3.200	54.06
N	1.00	1.25	.75	3.796	3.170	53.06
D	1.00	1.25	.75	3.747	3.125	50.31
1937						
J	1.00	1.25	.75	3.764	3.146	51.44

TABLE 11

AN ADJUSTED ARITHMETIC AVERAGE INDEX NUMBER¹ OF THE YIELDS OF
AMERICAN RAILROAD BONDS,
MONTHLY, JANUARY 1857-JANUARY 1936

- Col. 1 Logarithms of Index.
Col. 2. Cyclical Curve (logarithms).
Col. 3. Trend Curve (logarithms).
Col. 4. Deviations of Cyclical Curve (logarithms) from Trend Curve (logarithms).

For the nature of the graduations given in columns 2 and 3 see Appendix D.

¹See Table 10.

RAILROAD BOND YIELDS

A163

TABLE 11

AN ADJUSTED ARITHMETIC INDEX NUMBER OF THE YIELDS OF
AMERICAN RAILROAD BONDS.

Date	1	2	3	4	Date	1	2	3	4
1857					1862				
J	.8209	.8249	.8255	-.0006	J	.7879	.7920	.7452	+.0468
F	.8180	.8268	.8261	+.0007	F	.7710	.7854	.7426	+.0428
M	.8190	.8301	.8264	+.0037	M	.7752	.7775	.7397	+.0378
A	.8208	.8346	.8266	+.0080	A	.7723	.7682	.7369	+.0313
M	.8258	.8401	.8265	+.0136	M	.7498	.7578	.7343	+.0235
J	.8356	.8460	.8264	+.0196	J	.7385	.7464	.7318	+.0146
J	.8377	.8518	.8262	+.0256	J	.7423	.7344	.7292	+.0052
A	.8421	.8568	.8260	+.0308	A	.7335	.7224	.7268	-.0044
S	.8850	.8604	.8258	+.0346	S	.7197	.7109	.7245	-.0136
O	.9154	.8624	.8254	+.0370	O	.7029	.7001	.7223	-.0222
N	.8847	.8624	.8249	+.0375	N	.6936	.6905	.7203	-.0298
D	.8673	.8602	.8244	+.0358	D	.6973	.6824	.7184	-.0360
1858					1863				
J	.8558	.8558	.8237	+.0321	J	.6613	.6761	.7166	-.0405
F	.8338	.8494	.8230	+.0264	F	.6474	.6719	.7152	-.0433
M	.8192	.8413	.8222	+.0191	M	.6542	.6699	.7138	-.0439
A	.8173	.8321	.8216	+.0105	A	.6740	.6700	.7126	-.0426
M	.8129	.8225	.8208	+.0017	M	.6749	.6722	.7113	-.0391
J	.8107	.8131	.8200	-.0069	J	.6799	.6759	.7105	-.0346
J	.8079	.8047	.8193	-.0146	J	.6844	.6806	.7099	-.0293
A	.8080	.7978	.8186	-.0208	A	.6872	.6854	.7097	-.0243
S	.8032	.7926	.8178	-.0252	S	.6869	.6895	.7093	-.0198
O	.7918	.7892	.8170	-.0278	O	.6838	.6923	.7093	-.0170
N	.7869	.7875	.8162	-.0287	N	.6933	.6933	.7097	-.0164
D	.7858	.7870	.8155	-.0285	D	.7017	.6923	.7100	-.0177
1859					1864				
J	.7861	.7874	.8146	-.0272	J	.7082	.6895	.7104	-.0209
F	.7854	.7884	.8137	-.0253	F	.7055	.6855	.7112	-.0257
M	.7857	.7899	.8128	-.0229	M	.6917	.6810	.7121	-.0311
A	.7843	.7916	.8119	-.0203	A	.6752	.6766	.7132	-.0366
M	.7925	.7934	.8109	-.0175	M	.6743	.6734	.7148	-.0414
J	.8040	.7953	.8099	-.0146	J	.6667	.6720	.7161	-.0441
J	.8037	.7970	.8088	-.0118	J	.6398	.6728	.7178	-.0450
A	.8009	.7982	.8076	-.0094	A	.6414	.6761	.7197	-.0436
S	.7923	.7988	.8064	-.0076	S	.6730	.6821	.7221	-.0400
O	.7952	.7984	.8053	-.0069	O	.7066	.6904	.7244	-.0340
N	.7976	.7969	.8040	-.0071	N	.7029	.7009	.7269	-.0260
D	.7962	.7944	.8027	-.0083	D	.7155	.7129	.7294	-.0165
1860					1865				
J	.7957	.7912	.8010	-.0098	J	.7325	.7259	.7320	-.0061
F	.7928	.7875	.7997	-.0122	F	.7452	.7391	.7348	+.0043
M	.7893	.7838	.7981	-.0143	M	.7679	.7520	.7378	+.0142
A	.7842	.7804	.7964	-.0160	A	.7750	.7640	.7407	+.0233
M	.7762	.7776	.7945	-.0169	M	.7734	.7745	.7438	+.0307
J	.7688	.7755	.7927	-.0172	J	.7917	.7835	.7469	+.0366
J	.7655	.7744	.7908	-.0164	J	.7843	.7909	.7501	+.0408
A	.7643	.7742	.7888	-.0146	A	.7868	.7968	.7532	+.0436
S	.7655	.7749	.7868	-.0119	S	.7900	.8013	.7567	+.0446
O	.7690	.7767	.7848	-.0081	O	.7957	.8047	.7599	+.0448
N	.7898	.7793	.7825	-.0032	N	.8030	.8071	.7632	+.0439
D	.8089	.7828	.7802	+.0026	D	.8067	.8087	.7666	+.0421
1861					1866				
J	.7931	.7869	.7778	+.0091	J	.8123	.8096	.7697	+.0399
F	.7891	.7914	.7754	+.0160	F	.8152	.8097	.7729	+.0368
M	.7854	.7960	.7728	+.0232	M	.8200	.8093	.7759	+.0334
A	.7896	.8001	.7703	+.0298	A	.8168	.8084	.7788	+.0296
M	.8124	.8036	.7676	+.0360	M	.8085	.8070	.7816	+.0254
J	.8095	.8061	.7649	+.0412	J	.8062	.8053	.7843	+.0210
J	.7983	.8075	.7622	+.0453	J	.8001	.8034	.7869	+.0165
A	.8000	.8076	.7595	+.0481	A	.7965	.8015	.7894	+.0121
S	.8072	.8067	.7566	+.0501	S	.7939	.7996	.7916	+.0080
O	.8117	.8046	.7539	+.0507	O	.7922	.7980	.7939	+.0041
N	.8090	.8015	.7511	+.0504	N	.7896	.7969	.7959	+.0010
D	.8089	.7973	.7482	+.0491	D	.7965	.7963	.7980	-.0017

TABLE 11 (Continued)

AN ADJUSTED ARITHMETIC INDEX NUMBER OF THE YIELDS OF
AMERICAN RAILROAD BONDS.

Date	1	2	3	4	Date	1	2	3	4
1867					1872				
J	.7985	.7963	.7994	-.0031	J	.7906	.7947	.8018	-.0071
F	.7998	.7969	.8008	-.0039	F	.7881	.7937	.8012	-.0075
M	.8005	.7980	.8023	-.0043	M	.7933	.7929	.8006	-.0077
A	.8037	.7993	.8036	-.0043	A	.7923	.7922	.7998	-.0076
M	.8048	.8006	.8048	-.0042	M	.7921	.7918	.7992	-.0074
J	.8045	.8017	.8059	-.0042	J	.7892	.7914	.7984	-.0070
J	.7965	.8025	.8070	-.0045	J	.7835	.7911	.7977	-.0066
A	.7955	.8026	.8077	-.0051	A	.7875	.7908	.7968	-.0060
S	.7964	.8023	.8082	-.0059	S	.7916	.7906	.7959	-.0053
O	.8014	.8014	.8088	-.0074	O	.7941	.7903	.7950	-.0047
N	.8055	.8002	.8093	-.0091	N	.7967	.7903	.7939	-.0036
D	.8072	.7987	.8096	-.0109	D	.7970	.7903	.7931	-.0028
1868					1873				
J	.8002	.7973	.8098	-.0125	J	.7917	.7906	.7918	-.0012
F	.7951	.7959	.8100	-.0141	F	.7900	.7910	.7907	+ .0003
M	.7935	.7949	.8102	-.0153	M	.7903	.7916	.7894	+ .0022
A	.7955	.7944	.8102	-.0158	A	.7915	.7922	.7882	+ .0040
M	.7923	.7942	.8101	-.0159	M	.7896	.7928	.7869	+ .0059
J	.7907	.7945	.8100	-.0155	J	.7866	.7933	.7857	+ .0076
J	.7902	.7952	.8100	-.0148	J	.7826	.7935	.7843	+ .0092
A	.7912	.7962	.8098	-.0136	A	.7826	.7935	.7829	+ .0106
S	.7955	.7975	.8095	-.0120	S	.7900	.7932	.7813	+ .0119
O	.7999	.7991	.8093	-.0102	O	.8120	.7926	.7798	+ .0128
N	.8048	.8009	.8091	-.0082	N	.8127	.7917	.7784	+ .0133
D	.8087	.8029	.8088	-.0059	D	.7996	.7905	.7767	+ .0138
1869					1874				
J	.8088	.8052	.8084	-.0032	J	.7839	.7889	.7749	+ .0140
F	.8095	.8075	.8082	-.0007	F	.7766	.7868	.7732	+ .0136
M	.8125	.8098	.8080	+ .0018	M	.7757	.7843	.7714	+ .0129
A	.8141	.8121	.8078	+ .0043	A	.7740	.7814	.7697	+ .0117
M	.8081	.8141	.8075	+ .0066	M	.7771	.7781	.7680	+ .0101
J	.8074	.8157	.8073	+ .0084	J	.7728	.7746	.7661	+ .0085
J	.8118	.8169	.8072	+ .0097	J	.7724	.7710	.7642	+ .0068
A	.8110	.8175	.8071	+ .0104	A	.7713	.7674	.7624	+ .0050
S	.8159	.8176	.8070	+ .0106	S	.7688	.7640	.7608	+ .0032
O	.8221	.8172	.8070	+ .0102	O	.7641	.7608	.7589	+ .0019
N	.8245	.8164	.8069	+ .0095	N	.7574	.7578	.7571	+ .0007
D	.8272	.8153	.8068	+ .0085	D	.7561	.7549	.7553	-.0004
1870					1875				
J	.8229	.8139	.8068	+ .0071	J	.7506	.7520	.7534	-.0014
F	.8096	.8124	.8068	+ .0056	F	.7478	.7491	.7517	-.0026
M	.8042	.8106	.8067	+ .0041	M	.7461	.7466	.7499	-.0033
A	.8064	.8092	.8067	+ .0025	A	.7403	.7436	.7481	-.0045
M	.8028	.8078	.8066	+ .0012	M	.7370	.7407	.7462	-.0055
J	.7996	.8064	.8065	-.0001	J	.7388	.7379	.7446	-.0067
J	.7991	.8053	.8064	-.0011	J	.7344	.7352	.7428	-.0076
A	.8040	.8045	.8063	-.0018	A	.7332	.7323	.7411	-.0088
S	.8058	.8039	.8063	-.0024	S	.7299	.7298	.7394	-.0096
O	.8070	.8038	.8062	-.0024	O	.7324	.7274	.7377	-.0103
N	.8083	.8038	.8060	-.0022	N	.7292	.7251	.7361	-.0110
D	.8108	.8041	.8059	-.0018	D	.7242	.7227	.7345	-.0118
1871					1876				
J	.8074	.8043	.8058	-.0015	J	.7196	.7204	.7330	-.0126
F	.8050	.8046	.8056	-.0010	F	.7150	.7182	.7316	-.0134
M	.8041	.8045	.8054	-.0009	M	.7120	.7161	.7301	-.0140
A	.8031	.8042	.8051	-.0009	A	.7141	.7144	.7288	-.0144
M	.8002	.8037	.8049	-.0012	M	.7163	.7130	.7272	-.0142
J	.7998	.8029	.8047	-.0018	J	.7142	.7120	.7259	-.0139
J	.7994	.8019	.8044	-.0025	J	.7090	.7115	.7245	-.0130
A	.7973	.8008	.8040	-.0032	A	.7066	.7114	.7232	-.0118
S	.7959	.7995	.8036	-.0041	S	.7134	.7117	.7220	-.0103
O	.8040	.7982	.8031	-.0049	O	.7139	.7122	.7208	-.0086
N	.8070	.7970	.8027	-.0057	N	.7131	.7128	.7198	-.0070
D	.8034	.7958	.8023	-.0065	D	.7131	.7135	.7186	-.0051

TABLE 11 (Continued)

AN ADJUSTED ARITHMETIC INDEX NUMBER OF THE YIELDS OF
AMERICAN RAILROAD BONDS.

Date	1	2	3	4	Date	1	2	3	4
1877					1882				
J	.7105	.7141	.7174	-.0033	J	.6219	.6208	.6248	-.0040
F	.7137	.7146	.7165	-.0019	F	.6247	.6217	.6242	-.0025
M	.7199	.7150	.7154	-.0004	M	.6270	.6224	.6238	-.0014
A	.7210	.7152	.7143	+.0009	A	.6224	.6230	.6233	.0003
M	.7177	.7152	.7132	+.0020	M	.6201	.6132	.6230	+.0002
J	.7126	.7151	.7122	+.0029	J	.6206	.6133	.6227	+.0006
J	.7086	.7150	.7111	+.0039	J	.6190	.6232	.6223	+.0009
A	.7112	.7144	.7101	+.0043	A	.6222	.6230	.6220	+.0010
S	.7130	.7139	.7090	+.0049	S	.6241	.6229	.6218	+.0011
O	.7154	.7133	.7079	+.0054	O	.6232	.6229	.6216	+.0013
N	.7145	.7128	.7068	+.0060	N	.6254	.6232	.6213	+.0019
D	.7117	.7124	.7057	+.0067	D	.6252	.6236	.6211	+.0025
1878					1883				
J	.7120	.7121	.7044	+.0077	J	.6217	.6243	.6208	+.0035
F	.7117	.7118	.7033	+.0085	F	.6250	.6251	.6204	+.0047
M	.7123	.7116	.7020	+.0096	M	.6267	.6258	.6202	+.0056
A	.7124	.7113	.7008	+.0105	A	.6249	.6262	.6199	+.0063
M	.7099	.7107	.6992	+.0115	M	.6246	.6263	.6196	+.0067
J	.7049	.7099	.6979	+.0120	J	.6244	.6261	.6192	+.0069
J	.7049	.7086	.6965	+.0121	J	.6243	.6254	.6187	+.0067
A	.7080	.7069	.6949	+.0120	A	.6277	.6245	.6182	+.0063
S	.7078	.7046	.6931	+.0115	S	.6283	.6234	.6178	+.0056
O	.7058	.7020	.6914	+.0106	O	.6274	.6223	.6173	+.0050
N	.7027	.6991	.6897	+.0094	N	.6243	.6213	.6168	+.0045
D	.7012	.6959	.6879	+.0080	D	.6224	.6204	.6163	+.0041
1879					1884				
J	.6921	.6926	.6861	+.0065	J	.6194	.6199	.6155	+.0044
F	.6802	.6893	.6842	+.0051	F	.6149	.6196	.6149	+.0047
M	.6874	.6861	.6823	+.0038	M	.6114	.6196	.6141	+.0055
A	.6875	.6830	.6804	+.0026	A	.6088	.6197	.6133	+.0064
M	.6774	.6802	.6784	+.0018	M	.6170	.6200	.6125	+.0075
J	.6735	.6777	.6765	+.0012	J	.6273	.6204	.6116	+.0088
J	.6696	.6756	.6743	+.0013	J	.6286	.6207	.6107	+.0100
A	.6691	.6738	.6722	+.0016	A	.6219	.6209	.6098	+.0111
S	.6768	.6724	.6701	+.0023	S	.6227	.6208	.6039	+.0119
O	.6757	.6712	.6680	+.0032	O	.6222	.6205	.6080	+.0123
N	.6739	.6702	.6659	+.0043	N	.6228	.6194	.6069	+.0125
D	.6707	.6690	.6638	+.0052	D	.6190	.6180	.6058	+.0122
1880					1885				
J	.6668	.6676	.6615	+.0061	J	.6142	.6170	.6046	+.0124
F	.6613	.6658	.6594	+.0064	F	.6105	.6136	.6034	+.0102
M	.6600	.6634	.6572	+.0062	M	.6066	.6108	.6022	+.0086
A	.6609	.6606	.6551	+.0055	A	.6056	.6077	.6011	+.0066
M	.6601	.6564	.6530	+.0034	M	.6039	.6043	.5997	+.0046
J	.6566	.6526	.6508	+.0018	J	.5985	.6008	.5984	+.0024
J	.6496	.6484	.6488	-.0004	J	.5954	.5973	.5971	+.0002
A	.6451	.6440	.6467	-.0027	A	.5945	.5939	.5958	-.0019
S	.6421	.6394	.6450	-.0056	S	.5931	.5903	.5944	-.0041
O	.6379	.6357	.6430	-.0073	O	.5888	.5867	.5931	-.0064
N	.6277	.6312	.6412	-.0100	N	.5858	.5831	.5917	-.0086
D	.6208	.6269	.6396	-.0127	D	.5835	.5796	.5902	-.0106
1881					1886				
J	.6167	.6230	.6379	-.0149	J	.5761	.5762	.5889	-.0127
F	.6213	.6197	.6363	-.0166	F	.5685	.5732	.5875	-.0143
M	.6257	.6170	.6349	-.0179	M	.5670	.5707	.5862	-.0155
A	.6242	.6152	.6336	-.0184	A	.5682	.5685	.5848	-.0163
M	.6127	.6141	.6321	-.0180	M	.5678	.5669	.5835	-.0166
J	.6059	.6138	.6308	-.0170	J	.5643	.5657	.5822	-.0165
J	.6062	.6141	.6296	-.0155	J	.5609	.5650	.5808	-.0158
A	.6097	.6148	.6287	-.0139	A	.5621	.5647	.5795	-.0148
S	.6177	.6159	.6277	-.0118	S	.5685	.5650	.5782	-.0132
O	.6221	.6172	.6268	-.0096	O	.5686	.5653	.5770	-.0117
N	.6199	.6184	.6261	-.0077	N	.5684	.5660	.5758	-.0098
D	.6224	.6197	.6253	-.0056	D	.5712	.5671	.5746	-.0075

TABLE 11 (Continued)

AN ADJUSTED ARITHMETIC INDEX NUMBER OF THE YIELDS OF
AMERICAN RAILROAD BONDS.

Date	1	2	3	4	Date	1	2	3	4
1887					1892				
J	.5685	.5684	.5732	- .0048	J	.5739	.5774	.5762	+ .0012
F	.5694	.5698	.5721	- .0023	F	.5713	.5751	.5765	- .0014
M	.5711	.5713	.5709	+ .0004	M	.5722	.5729	.5768	- .0039
A	.5716	.5728	.5699	+ .0029	A	.5705	.5708	.5770	- .0062
M	.5699	.5743	.5688	+ .0055	M	.5683	.5690	.5770	- .0080
J	.5703	.5756	.5679	+ .0077	J	.5669	.5676	.5770	- .0094
J	.5723	.5766	.5669	+ .0097	J	.5657	.5665	.5770	- .0105
A	.5758	.5774	.5661	+ .0113	A	.5667	.5660	.5769	- .0109
S	.5838	.5779	.5652	+ .0127	S	.5711	.5661	.5768	- .0107
O	.5865	.5780	.5646	+ .0134	O	.5710	.5669	.5766	- .0097
N	.5822	.5778	.5639	+ .0139	N	.5719	.5683	.5762	- .0079
D	.5801	.5772	.5632	+ .0140	D	.5736	.5705	.5759	- .0054
1888					1893				
J	.5731	.5763	.5625	+ .0138	J	.5712	.5731	.5756	- .0025
F	.5701	.5751	.5621	+ .0130	F	.5679	.5760	.5751	+ .0009
M	.5719	.5736	.5616	+ .0120	M	.5714	.5790	.5748	+ .0042
A	.5718	.5720	.5612	+ .0108	A	.5718	.5818	.5742	+ .0076
M	.5696	.5703	.5609	+ .0094	M	.5769	.5841	.5735	+ .0106
J	.5670	.5684	.5607	+ .0077	J	.5839	.5858	.5729	+ .0129
J	.5616	.5666	.5605	+ .0061	J	.5979	.5868	.5722	+ .0146
A	.5608	.5647	.5604	+ .0043	A	.6081	.5869	.5714	+ .0155
S	.5640	.5628	.5603	+ .0025	S	.5944	.5862	.5706	+ .0156
O	.5648	.5608	.5603	+ .0005	O	.5886	.5846	.5698	+ .0148
N	.5629	.5588	.5603	- .0015	N	.5788	.5821	.5690	+ .0131
D	.5614	.5567	.5604	- .0037	D	.5722	.5789	.5681	+ .0108
1889					1894				
J	.5562	.5547	.5604	- .0057	J	.5714	.5750	.5671	+ .0079
F	.5509	.5528	.5606	- .0078	F	.5660	.5708	.5662	+ .0046
M	.5520	.5510	.5608	- .0098	M	.5620	.5664	.5654	+ .0010
A	.5511	.5494	.5609	- .0115	A	.5570	.5623	.5645	- .0022
M	.5460	.5482	.5610	- .0128	M	.5572	.5588	.5632	- .0044
J	.5411	.5474	.5613	- .0139	J	.5576	.5559	.5624	- .0065
J	.5436	.5470	.5616	- .0146	J	.5591	.5539	.5613	- .0074
A	.5448	.5470	.5618	- .0148	A	.5566	.5525	.5603	- .0078
S	.5455	.5474	.5621	- .0147	S	.5534	.5517	.5591	- .0074
O	.5504	.5482	.5623	- .0141	O	.5493	.5511	.5582	- .0071
N	.5543	.5494	.5627	- .0133	N	.5461	.5505	.5573	- .0068
D	.5560	.5509	.5630	- .0121	D	.5458	.5497	.5563	- .0066
1890					1895				
J	.5544	.5526	.5635	- .0109	J	.5465	.5486	.5551	- .0065
F	.5549	.5545	.5639	- .0094	F	.5504	.5472	.5542	- .0070
M	.5572	.5565	.5644	- .0079	M	.5517	.5455	.5533	- .0078
A	.5576	.5585	.5648	- .0063	A	.5522	.5438	.5523	- .0085
M	.5579	.5604	.5653	- .0049	M	.5464	.5419	.5512	- .0093
J	.5601	.5624	.5658	- .0034	J	.5393	.5402	.5503	- .0101
J	.5617	.5643	.5663	- .0020	J	.5359	.5385	.5493	- .0108
A	.5660	.5663	.5669	- .0006	A	.5305	.5371	.5482	- .0111
S	.5688	.5685	.5674	+ .0011	S	.5310	.5360	.5471	- .0111
O	.5720	.5708	.5679	+ .0029	O	.5320	.5355	.5460	- .0105
N	.5779	.5733	.5685	+ .0048	N	.5338	.5356	.5450	- .0094
D	.5834	.5760	.5691	+ .0069	D	.5400	.5363	.5440	- .0077
1891					1896				
J	.5737	.5788	.5698	+ .0090	J	.5459	.5378	.5429	- .0051
F	.5740	.5812	.5703	+ .0109	F	.5410	.5399	.5417	- .0018
M	.5798	.5835	.5710	+ .0125	M	.5414	.5423	.5406	+ .0017
A	.5816	.5853	.5717	+ .0136	A	.5409	.5448	.5395	+ .0053
M	.5853	.5866	.5723	+ .0143	M	.5386	.5469	.5383	+ .0086
J	.5912	.5872	.5729	+ .0143	J	.5372	.5485	.5372	+ .0113
J	.5910	.5873	.5736	+ .0137	J	.5467	.5494	.5361	+ .0133
A	.5912	.5867	.5741	+ .0126	A	.5667	.5499	.5349	+ .0148
S	.5892	.5856	.5746	+ .0110	S	.5590	.5485	.5336	+ .0149
O	.5852	.5839	.5752	+ .0087	O	.5547	.5468	.5325	+ .0143
N	.5824	.5819	.5756	+ .0063	N	.5439	.5444	.5313	+ .0131
D	.5785	.5797	.5760	+ .0037	D	.5386	.5414	.5301	+ .0113

RAILROAD BOND YIELDS

A167

TABLE 11 (Continued)

AN ADJUSTED ARITHMETIC INDEX NUMBER OF THE YIELDS OF
AMERICAN RAILROAD BONDS.

Date	1	2	3	4	Date	1	2	3	4
1897					1902				
J	.5331	.5380	.5290	+.0090	J	.5049	.5058	.5132	-.0074
F	.5301	.5347	.5279	+.0068	F	.5047	.5063	.5143	-.0080
M	.5240	.5308	.5268	+.0040	M	.5053	.5068	.5155	-.0087
A	.5251	.5269	.5257	+.0012	A	.5052	.5076	.5167	-.0091
M	.5235	.5233	.5245	-.0012	M	.5074	.5087	.5178	-.0091
J	.5196	.5203	.5235	-.0032	J	.5097	.5100	.5189	-.0089
J	.5157	.5174	.5225	-.0051	J	.5122	.5118	.5200	-.0082
A	.5180	.5160	.5215	-.0055	A	.5147	.5138	.5212	-.0074
S	.5190	.5153	.5204	-.0051	S	.5172	.5164	.5224	-.0060
O	.5192	.5153	.5195	-.0042	O	.5218	.5192	.5235	-.0043
N	.5171	.5159	.5185	-.0026	N	.5236	.5223	.5246	-.0023
D	.5115	.5167	.5175	-.0008	D	.5269	.5256	.5257	-.0001
1898					1903				
J	.5090	.5175	.5165	+.0010	J	.5266	.5290	.5267	+.0023
F	.5096	.5182	.5156	+.0026	F	.5289	.5323	.5277	+.0046
M	.5195	.5186	.5147	+.0039	M	.5349	.5356	.5287	+.0069
A	.5297	.5186	.5137	+.0049	A	.5393	.5386	.5296	+.0090
M	.5252	.5181	.5128	+.0052	M	.5379	.5415	.5305	+.0110
M	.5188	.5172	.5118	+.0054	J	.5423	.5441	.5314	+.0127
J	.5135	.5157	.5109	+.0048	J	.5480	.5463	.5322	+.0141
A	.5103	.5135	.5100	+.0035	A	.5536	.5482	.5330	+.0152
S	.5124	.5109	.5091	+.0018	S	.5546	.5498	.5339	+.0159
O	.5091	.5078	.5082	-.0004	O	.5507	.5509	.5347	+.0162
N	.5048	.5044	.5073	-.0028	N	.5478	.5515	.5354	+.0161
D	.5008	.5010	.5065	-.0055	D	.5492	.5517	.5360	+.0157
1899					1904				
J	.4951	.4980	.5055	-.0075	J	.5486	.5515	.5368	+.0147
F	.4958	.4954	.5048	-.0094	F	.5502	.5509	.5375	+.0134
M	.4961	.4935	.5040	-.0105	M	.5521	.5500	.5382	+.0118
A	.4918	.4923	.5031	-.0108	A	.5501	.5488	.5389	+.0099
M	.4883	.4919	.5023	-.0104	M	.5489	.5476	.5397	+.0079
J	.4873	.4922	.5017	-.0095	J	.5468	.5463	.5403	+.0060
J	.4898	.4930	.5010	-.0080	J	.5430	.5450	.5411	+.0039
A	.4924	.4943	.5003	-.0060	A	.5421	.5438	.5418	+.0020
S	.4967	.4957	.4998	-.0041	S	.5428	.5427	.5426	+.0001
O	.5011	.4973	.4994	-.0021	O	.5424	.5417	.5433	-.0016
N	.5038	.4990	.4990	.0000	N	.5416	.5408	.5440	-.0032
D	.5086	.5006	.4987	+.0019	D	.5407	.5400	.5448	-.0048
1900					1905				
J	.5048	.5020	.4983	+.0037	J	.5377	.5393	.5456	-.0063
F	.5013	.5032	.4983	+.0049	F	.5367	.5387	.5462	-.0075
M	.5002	.5040	.4982	+.0058	M	.5382	.5383	.5470	-.0087
A	.4983	.5044	.4981	+.0063	A	.5392	.5381	.5477	-.0096
M	.5021	.5044	.4981	+.0063	M	.5400	.5380	.5485	-.0105
J	.5040	.5041	.4982	+.0059	J	.5396	.5382	.5492	-.0110
J	.5041	.5035	.4984	+.0051	J	.5384	.5385	.5500	-.0115
A	.5044	.5027	.4986	+.0041	A	.5388	.5390	.5508	-.0118
S	.5050	.5020	.4992	+.0028	S	.5389	.5398	.5513	-.0115
O	.5054	.5013	.4996	+.0017	O	.5391	.5407	.5520	-.0113
N	.5028	.5008	.5002	+.0006	N	.5419	.5417	.5527	-.0110
D	.4997	.5006	.5008	-.0002	D	.5430	.5429	.5532	-.0103
1901					1906				
J	.4986	.5005	.5015	-.0010	J	.5418	.5442	.5538	-.0096
F	.4969	.5006	.5023	-.0017	F	.5439	.5455	.5543	-.0088
M	.4971	.5009	.5031	-.0022	M	.5476	.5469	.5550	-.0081
A	.4985	.5013	.5039	-.0026	A	.5496	.5481	.5556	-.0075
M	.5022	.5018	.5048	-.0030	M	.5513	.5493	.5561	-.0068
J	.5013	.5023	.5059	-.0036	J	.5498	.5503	.5567	-.0064
J	.5038	.5028	.5068	-.0040	J	.5512	.5513	.5572	-.0059
A	.5062	.5034	.5078	-.0044	A	.5534	.5521	.5578	-.0057
S	.5075	.5040	.5088	-.0048	S	.5563	.5529	.5583	-.0054
O	.5077	.5045	.5098	-.0053	O	.5549	.5538	.5590	-.0052
N	.5051	.5049	.5109	-.0060	N	.5540	.5549	.5596	-.0047
D	.5058	.5054	.5120	-.0066	D	.5556	.5564	.5601	-.0037

TABLE 11 (Continued)

AN ADJUSTED ARITHMETIC INDEX NUMBER OF THE YIELDS OF
AMERICAN RAILROAD BONDS.

Date	1	2	3	4	Date	1	2	3	4
1907					1912				
J	.5566	.5584	.5606	-.0022	J	.5850	.5862	.5890	-.0028
F	.5588	.5609	.5613	-.0004	F	.5840	.5864	.5900	-.0036
M	.5662	.5640	.5619	+.0021	M	.5857	.5866	.5909	-.0043
A	.5660	.5675	.5625	+.0050	A	.5866	.5869	.5919	-.0050
M	.5682	.5714	.5630	+.0084	M	.5871	.5872	.5929	-.0057
J	.5733	.5753	.5637	+.0116	J	.5884	.5877	.5939	-.0062
J	.5731	.5790	.5642	+.0148	J	.5894	.5883	.5949	-.0066
A	.5788	.5825	.5649	+.0176	A	.5916	.5893	.5958	-.0065
S	.5843	.5854	.5656	+.0198	S	.5936	.5905	.5968	-.0063
O	.5921	.5876	.5661	+.0215	O	.5932	.5920	.5977	-.0057
N	.6087	.5890	.5668	+.0222	N	.5930	.5939	.5986	-.0047
D	.5976	.5896	.5672	+.0224	D	.5945	.5960	.5995	-.0035
1908					1913				
J	.5821	.5893	.5680	+.0213	J	.5928	.5983	.6003	-.0020
F	.5809	.5881	.5686	+.0195	F	.5944	.6007	.6010	-.0003
M	.5844	.5861	.5692	+.0169	M	.6012	.6032	.6018	+.0014
A	.5814	.5835	.5697	+.0138	A	.6061	.6056	.6024	+.0032
M	.5774	.5803	.5702	+.0101	M	.6110	.6078	.6030	+.0048
J	.5771	.5769	.5707	+.0062	J	.6156	.6096	.6036	+.0060
J	.5748	.5735	.5711	+.0024	J	.6153	.6109	.6040	+.0069
A	.5706	.5702	.5716	-.0014	A	.6110	.6117	.6045	+.0072
S	.5674	.5673	.5719	-.0046	S	.6069	.6118	.6049	+.0069
O	.5666	.5648	.5722	-.0074	O	.6103	.6114	.6053	+.0061
N	.5631	.5638	.5726	-.0078	N	.6157	.6105	.6058	+.0047
D	.5615	.5612	.5729	-.0117	D	.6168	.6094	.6062	+.0032
1909					1914				
J	.5593	.5602	.5731	-.0129	J	.6087	.6082	.6063	+.0019
F	.5569	.5596	.5735	-.0139	F	.6018	.6072	.6067	+.0005
M	.5587	.5593	.5738	-.0145	M	.6038	.6065	.6070	-.0005
A	.5576	.5594	.5740	-.0146	A	.6036	.6063	.6072	-.0009
M	.5597	.5598	.5740	-.0142	M	.6034	.6065	.6075	-.0010
J	.5620	.5606	.5742	-.0136	J	.6021	.6072	.6078	-.0006
J	.5620	.5618	.5746	-.0128	J	.6065	.6084	.6081	+.0003
A	.5637	.5633	.5747	-.0114	A	.6104 ⁹	.6100	.6083	+.0017
S	.5664	.5651	.5748	-.0097	S	.6145 ⁹	.6119	.6087	+.0032
O	.5684	.5672	.5749	-.0077	O	.6182 ⁹	.6141	.6090	+.0051
N	.5704	.5694	.5751	-.0057	N	.6220 ⁹	.6165	.6094	+.0071
D	.5714	.5717	.5753	-.0036	D	.6258	.6188	.6099	+.0089
1910					1915				
J	.5719	.5739	.5756	-.0017	J	.6197	.6211	.6103	+.0108
F	.5728	.5760	.5758	+.0002	F	.6189	.6229	.6108	+.0121
M	.5753	.5779	.5760	+.0019	M	.6219	.6242	.6113	+.0129
A	.5802	.5795	.5762	+.0033	A	.6175	.6248	.6117	+.0131
M	.5825	.5809	.5766	+.0043	M	.6183	.6247	.6121	+.0126
J	.5846	.5820	.5770	+.0050	J	.6214	.6239	.6127	+.0112
J	.5873	.5829	.5775	+.0054	J	.6277	.6227	.6132	+.0095
A	.5869	.5834	.5777	+.0057	A	.6308	.6211	.6136	+.0075
S	.5821	.5838	.5780	+.0058	S	.6319	.6193	.6140	+.0053
O	.5799	.5839	.5785	+.0054	O	.6224	.6176	.6146	+.0030
N	.5832	.5840	.5789	+.0051	N	.6089	.6159	.6150	+.0009
D	.5831	.5840	.5793	+.0047	D	.6072	.6143	.6156	-.0013
1911					1916				
J	.5824	.5838	.5799	+.0039	J	.6055	.6127	.6162	-.0035
F	.5829	.5838	.5805	+.0033	F	.6041	.6116	.6168	-.0052
M	.5846	.5838	.5811	+.0027	M	.6055	.6095	.6176	-.0081
A	.5843	.5839	.5818	+.0021	A	.6071	.6079	.6182	-.0103
M	.5831	.5841	.5823	+.0018	M	.6080	.6063	.6189	-.0126
J	.5842	.5844	.5830	+.0014	J	.6085	.6048	.6198	-.0150
J	.5848	.5846	.5838	+.0008	J	.6096	.6036	.6207	-.0171
A	.5863	.5849	.5846	+.0003	A	.6113	.6026	.6216	-.0190
S	.5880	.5852	.5854	-.0002	S	.6100	.6019	.6225	-.0206
O	.5873	.5854	.5862	-.0008	O	.6042	.6018	.6236	-.0218
N	.5851	.5857	.5871	-.0014	N	.6003	.6021	.6248	-.0227
D	.5858	.5859	.5880	-.0021	D	.6004	.6031	.6259	-.0228

*Interpolated. Stock Exchange closed.

RAILROAD BOND YIELDS

A169

TABLE 11 (Continued)

AN ADJUSTED ARITHMETIC INDEX NUMBER OF THE YIELDS OF
AMERICAN RAILROAD BONDS.

Date	1	2	3	4	Date	1	2	3	4
1917					1922				
J	.5936	.6049	.6272	-.0223	J	.6538	.6633	.6773	-.0140
F	.6008	.6075	.6287	-.0212	F	.6545	.6556	.6762	-.0206
M	.6049	.6111	.6302	-.0191	M	.6508	.6487	.6750	-.0263
A	.6150	.6156	.6319	-.0163	A	.6428	.6429	.6738	-.0309
M	.6270	.6209	.6333	-.0124	M	.6407	.6386	.6725	-.0339
J	.6316	.6270	.6351	-.0081	J	.6405	.6358	.6712	-.0354
J	.6357	.6336	.6370	-.0034	J	.6326	.6346	.6700	-.0354
A	.6389	.6405	.6389	+ .0016	A	.6285	.6348	.6688	-.0340
A	.6474	.6473	.6409	+ .0064	S	.6276	.6361	.6677	-.0316
S	.6519	.6538	.6430	+ .0108	O	.6390	.6384	.6664	-.0280
O	.6642	.6598	.6451	+ .0147	N	.6473	.6413	.6653	-.0240
N	.6716	.6650	.6472	+ .0178	D	.6463	.6446	.6642	-.0196
D									
1918					1923				
J	.6685	.6692	.6495	+ .0197	J	.6465	.6480	.6631	-.0151
F	.6639	.6723	.6518	+ .0205	F	.6500	.6515	.6620	-.0105
M	.6699	.6743	.6541	+ .0202	M	.6623	.6548	.6609	-.0061
A	.6750	.6752	.6564	+ .0188	A	.6651	.6578	.6599	-.0021
M	.6688	.6750	.6587	+ .0163	M	.6585	.6604	.6589	+ .0015
J	.6738	.6740	.6609	+ .0131	J	.6605	.6626	.6579	+ .0047
J	.6788	.6723	.6632	+ .0091	J	.6618	.6642	.6570	+ .0072
A	.6788	.6703	.6654	+ .0049	A	.6597	.6652	.6562	+ .0090
S	.6834	.6681	.6678	+ .0003	S	.6637	.6656	.6553	+ .0103
O	.6726	.6660	.6699	-.0039	O	.6659	.6654	.6545	+ .0109
N	.6456	.6641	.6720	-.0079	N	.6632	.6647	.6537	+ .0110
D	.6474	.6626	.6742	-.0116	D	.6649	.6637	.6530	+ .0107
1919					1924				
J	.6558	.6614	.6762	-.0148	J	.6614	.6623	.6523	+ .0100
F	.6599	.6608	.6782	-.0174	F	.6633	.6609	.6517	+ .0092
M	.6651	.6608	.6799	-.0191	M	.6640	.6593	.6511	+ .0082
A	.6692	.6615	.6817	-.0202	A	.6612	.6577	.6505	+ .0072
M	.6646	.6631	.6833	-.0202	M	.6569	.6560	.6500	+ .0060
J	.6644	.6658	.6848	-.0190	J	.6508	.6544	.6495	+ .0049
J	.6699	.6695	.6862	-.0167	J	.6456	.6529	.6490	+ .0039
A	.6846	.6742	.6874	-.0132	A	.6496	.6514	.6485	+ .0029
S	.6879	.6798	.6887	-.0089	S	.6494	.6501	.6480	+ .0021
O	.6763	.6859	.6896	-.0037	O	.6474	.6490	.6476	+ .0014
N	.6874	.6923	.6905	+ .0018	N	.6482	.6482	.6471	+ .0011
D	.6926	.6986	.6915	+ .0071	D	.6517	.6477	.6466	+ .0011
1920					1925				
J	.6908	.7042	.6922	+ .0120	J	.6511	.6476	.6461	+ .0015
F	.7053	.7091	.6927	+ .0164	F	.6499	.6478	.6456	+ .0022
M	.7053	.7128	.6930	+ .0198	M	.6486	.6482	.6451	+ .0031
A	.7214	.7154	.6933	+ .0221	A	.6474	.6487	.6445	+ .0042
M	.7393	.7169	.6935	+ .0234	M	.6425	.6491	.6439	+ .0052
J	.7358	.7174	.6934	+ .0240	J	.6431	.6493	.6435	+ .0058
J	.7333	.7169	.6933	+ .0236	J	.6478	.6492	.6429	+ .0063
A	.7199	.7158	.6931	+ .0227	A	.6532	.6488	.6422	+ .0066
S	.7044	.7143	.6928	+ .0215	S	.6495	.6481	.6416	+ .0065
O	.6906	.7125	.6923	+ .0202	O	.6512	.6471	.6410	+ .0061
N	.6978	.7107	.6918	+ .0189	N	.6498	.6460	.6403	+ .0057
D	.7117	.7091	.6912	+ .0179	D	.6466	.6447	.6396	+ .0051
1921					1926				
J	.6967	.7078	.6903	+ .0175	J	.6430	.6433	.6390	+ .0043
F	.6987	.7068	.6896	+ .0172	F	.6399	.6419	.6383	+ .0036
M	.7039	.7061	.6888	+ .0173	M	.6407	.6405	.6376	+ .0029
A	.7068	.7053	.6878	+ .0175	A	.6353	.6390	.6370	+ .0020
M	.7083	.7043	.6866	+ .0177	M	.6320	.6376	.6364	+ .0012
J	.7192	.7029	.6856	+ .0173	J	.6323	.6362	.6357	+ .0005
J	.7078	.7005	.6845	+ .0160	J	.6350	.6350	.6351	-.0001
A	.7008	.6970	.6833	+ .0137	A	.6366	.6339	.6346	-.0007
S	.6945	.6922	.6822	+ .0100	S	.6364	.6330	.6342	-.0012
O	.6931	.6862	.6810	+ .0052	O	.6360	.6322	.6338	-.0016
N	.6745	.6791	.6798	-.0007	N	.6324	.6316	.6334	-.0018
D	.6619	.6713	.6786	-.0073	D	.6312	.6308	.6330	-.0022

TABLE 11 (Concluded)

AN ADJUSTED ARITHMETIC INDEX NUMBER OF THE YIELDS OF
AMERICAN RAILROAD BONDS.

Date	1	2	3	4	Date	1	2	3	4
1927					1932				
J	.6285	.6299	.6326	-.0027	J	.6753	.6668		
F	.6287	.6287	.6323	-.0036	F	.6806	.6733		
M	.6250	.6271	.6320	-.0049	M	.6713	.6778		
A	.6199	.6251	.6317	-.0066	A	.6846	.6801		
M	.6196	.6228	.6314	-.0086	M	.6856	.6800		
J	.6233	.6202	.6311	-.0109	J	.6900	.6777		
J	.6242	.6177	.6309	-.0132	J	.6811	.6736		
A	.6205	.6153	.6307	-.0154	A	.6571	.6681		
S	.6173	.6133	.6306	-.0173	S	.6489	.6618		
O	.6129	.6118	.6304	-.0186	O	.6489	.6552		
N	.6082	.6110	.6302	-.0192	N	.6521	.6488		
D	.6064	.6109	.6301	-.0192	D	.6410	.6429		
1928					1933				
J	.6073	.6115	.6300	-.0185	J	.6206	.6378		
F	.6099	.6128	.6299	-.0171	F	.6204	.6337		
M	.6109	.6146	.6298	-.0152	M	.6372	.6307		
A	.6132	.6170	.6297	-.0127	A	.6547	.6285		
M	.6181	.6199	.6296	-.0097	M	.6392	.6269		
J	.6283	.6230	.6295	-.0065	J	.6238	.6256		
J	.6352	.6264	.6294	-.0030	J	.6157	.6242		
A	.6412	.6300	.6294	+.0006	A	.6102	.6223		
S	.6364	.6335	.6295	+.0040	S	.6128	.6200		
O	.6360	.6369	.6296	+.0073	O	.6139	.6170		
N	.6322	.6402	.6297	+.0105	N	.6274	.6136		
D	.6395	.6431	.6299	+.0132	D	.6233	.6098		
1929					1934				
J	.6428	.6457	.6301	+.0156	J	.6111	.6058		
F	.6468	.6480	.6304	+.0176	F	.6016	.6017		
M	.6497	.6499	.6307	+.0192	M	.5940	.5975		
A	.6493	.6515	.6310	+.0205	A	.5872	.5932		
M	.6510	.6528	.6314	+.0214	M	.5812			
J	.6551	.6537			J	.5715			
J	.6576	.6542			J	.5707			
A	.6544	.6542			A	.5765			
S	.6604	.6536			S	.5828			
O	.6571	.6524			O	.5754			
N	.6479	.6506			N	.5658			
D	.6433	.6482			D	.5576			
1930					1935				
J	.6421	.6453			J	.5469			
F	.6410	.6421			F	.5363			
M	.6335	.6387			M	.5326			
A	.6387	.6355			A	.5329			
M	.6354	.6324			M	.5363			
J	.6322	.6294			J	.5336			
J	.6271	.6265			J	.5311			
A	.6203	.6236			A	.5379			
S	.6145	.6205			S	.5399			
O	.6124	.6172			O	.5414			
N	.6168	.6138			N	.5369			
D	.6232	.6105			D	.5333			
1931					1936				
J	.6105	.6075			J	.5263			
F	.6110	.6053							
M	.6122	.6041							
A	.6108	.6043							
M	.6023	.6063							
J	.6038	.6100							
J	.6030	.6155							
A	.6081	.6225							
S	.6149	.6309							
O	.6385	.6401							
N	.6524	.6495							
D	.6754	.6587							

NEW ENGLAND STATES, COUNTIES AND CITIES WHOSE BONDS WERE USED IN CONSTRUCTING INDEX NUMBERS, AND THE PERIODS DURING WHICH QUOTATIONS WERE USED

[illegible]

TABLE 12

NEW ENGLAND MUNICIPAL BOND YIELDS,
JANUARY INDEX NUMBERS

1. An unadjusted chain index number based on simple geometric averages of the yields each January.

2. An unadjusted chain index number based on simple arithmetic averages of the yields each January.

In both the index numbers (geometric and arithmetic), the chaining is backward from January 1914. The index numbers for January 1914 are therefore the averages (geometric or arithmetic) of the yields of the bonds used in January 1914.

Date	(1)	(2)
	Geometric Index	Arithmetic Index
	%	%
January 1857	5.211	5.198
" 1858	5.271	5.270
" 1859	4.854	4.843
" 1860	4.805	4.794
" 1861	4.923	4.909
" 1862	5.240	5.226
" 1863	4.410	4.403
" 1864	4.676	4.666
" 1865	5.164	5.153
" 1866	5.757	5.748
" 1867	5.265	5.255
" 1868	5.373	5.367
" 1869	5.318	5.310
" 1870	5.515	5.510
" 1871	5.439	5.432
" 1872	5.353	5.345
" 1873	5.496	5.484
" 1874	5.652	5.642
" 1875	5.336	5.327
" 1876	4.776	4.767
" 1877	4.530	4.525
" 1878	4.369	4.364
" 1879	4.287	4.285
" 1880	4.199	4.199
" 1881	3.838	3.843
" 1882	3.697	3.700
" 1883	3.619	3.621
" 1884	3.649	3.651
" 1885	3.593	3.595
" 1886	3.419	3.422
" 1887	3.409	3.407
" 1888	3.733	3.735
" 1889	3.589	3.589
" 1890	3.335	3.336
" 1891	3.640	3.646
" 1892	3.655	3.657
" 1893	3.611	3.613
" 1894	3.667	3.665
" 1895	3.470	3.470

TABLE 12 (Concluded)

Date	(1) Geometric Index	(2) Arithmetic Index
	%	%
January 1896	3.705	3.705
" 1897	3.437	3.435
" 1898	3.308	3.307
" 1899	3.123	3.121
" 1900	3.201	3.198
" 1901	3.081	3.081
" 1902	3.173	3.170
" 1903	3.253	3.250
" 1904	3.471	3.469
" 1905	3.400	3.398
" 1906	3.506	3.505
" 1907	3.759	3.760
" 1908	4.224	4.231
" 1909	3.878	3.879
" 1910	3.893	3.893
" 1911	4.008	4.007
" 1912	4.003	4.002
" 1913	4.239	4.242
" 1914	4.367	4.372

TABLE 13

NEW ENGLAND MUNICIPAL BOND YIELDS, ARITHMETIC AVERAGE
QUARTERLY INDEX NUMBER, JANUARY 1857-JANUARY 1914

An unadjusted chain index number based on simple arithmetic averages of the yields each quarter. The January 1914 figure is the arithmetic average of the bonds used in that month.

Date	Index	Date	Index	Date	Index
1857	%	1866	%	1875	%
J	5.198	J	5.748	J	5.327
A	5.118	A	5.603	A	5.128
J	5.102	J	5.502	J	4.966
O	5.382	O	5.230	O	4.868
1858		1867		1876	
J	5.270	J	5.255	J	4.767
A	5.006	A	5.349	A	4.637
J	4.957	J	5.411	J	4.497
O	4.921	O	5.362	O	4.476
1859		1868		1877	
J	4.843	J	5.367	J	4.525
A	4.818	A	5.275	A	4.466
J	4.833	J	5.245	J	4.384
O	4.798	O	5.258	O	4.407
1860		1869		1878	
J	4.794	J	5.310	J	4.364
A	4.800	A	5.366	A	4.381
J	4.767	J	5.394	J	4.330
O	4.806	O	5.462	O	4.301
1861		1870		1879	
J	4.909	J	5.510	J	4.285
A	4.878	A	5.452	A	4.256
J	5.102	J	5.400	J	4.191
O	5.270	O	5.409	O	4.146
1862		1871		1880	
J	5.226	J	5.432	J	4.199
A	5.064	A	5.337	A	3.959
J	4.864	J	5.291	J	3.994
O	4.508	O	5.243	O	3.937
1863		1872		1881	
J	4.403	J	5.345	J	3.843
A	4.201	A	5.314	A	3.713
J	4.426	J	5.360	J	3.653
O	4.457	O	5.458	O	3.654
1864		1873		1882	
J	4.666	J	5.484	J	3.700
A	4.678	A	5.541	A	3.639
J	4.903	J	5.512	J	3.579
O	5.080	O	5.675	O	3.611
1865		1874		1883	
J	5.153	J	5.642	J	3.621
A	5.617	A	5.470	A	3.632
J	5.664	J	5.420	J	3.621
O	5.736	O	5.412	O	3.665

MUNICIPAL BOND YIELDS

A175

TABLE 13—(Continued)

Date	Index	Date	Index	Date	Index
1884	%	1893	%	1902	%
J	3.651	J	3.613	J	3.170
A	3.591	A	3.631	A	3.189
J	3.633	J	3.829	J	3.262
O	3.627	O	3.887	O	3.251
1885		1894		1903	
J	3.595	J	3.665	J	3.250
A	3.540	A	3.753	A	3.305
J	3.505	J	3.700	J	3.483
O	3.465	O	3.651	O	3.462
1886		1895		1904	
J	3.422	J	3.470	J	3.469
A	3.366	A	3.451	A	3.474
J	3.363	J	3.469	J	3.459
O	3.393	O	3.465	O	3.409
1887		1896		1905	
J	3.407	J	3.705	J	3.398
A	3.441	A	3.432	A	3.386
J	3.535	J	3.579	J	3.458
O	3.749	O	3.719	O	3.503
1888		1897		1906	
J	3.735	J	3.435	J	3.505
A	3.687	A	3.407	A	3.552
J	3.654	J	3.380	J	3.661
O	3.615	O	3.349	O	3.754
1889		1898		1907	
J	3.589	J	3.307	J	3.760
A	3.482	A	3.608	A	3.847
J	3.410	J	3.279	J	3.905
O	3.349	O	3.191	O	4.101
1890		1899		1908	
J	3.336	J	3.121	J	4.231
A	3.378	A	3.106	A	3.977
J	3.427	J	3.068	J	3.994
O	3.540	O	3.144	O	3.926
1891		1900		1909	
J	3.646	J	3.198	J	3.879
A	3.591	A	3.165	A	3.807
J	3.674	J	3.139	J	3.845
O	3.641	O	3.105	O	3.893
1892		1901		1910	
J	3.657	J	3.081	J	3.893
A	3.611	A	3.109	A	3.991
J	3.583	J	3.136	J	4.085
O	3.580	O	3.168	O	4.048

TABLE 13—(Concluded)

Date	Index	Date	Index	Date	Index
1911	%	1912	%	1913	%
J	4.007	J	4.002	J	4.242
A	4.007	A	4.019	A	4.391
J	4.000	J	4.093	J	4.572
O	4.011	O	4.162	O	4.403
				1914	
				J	4.372

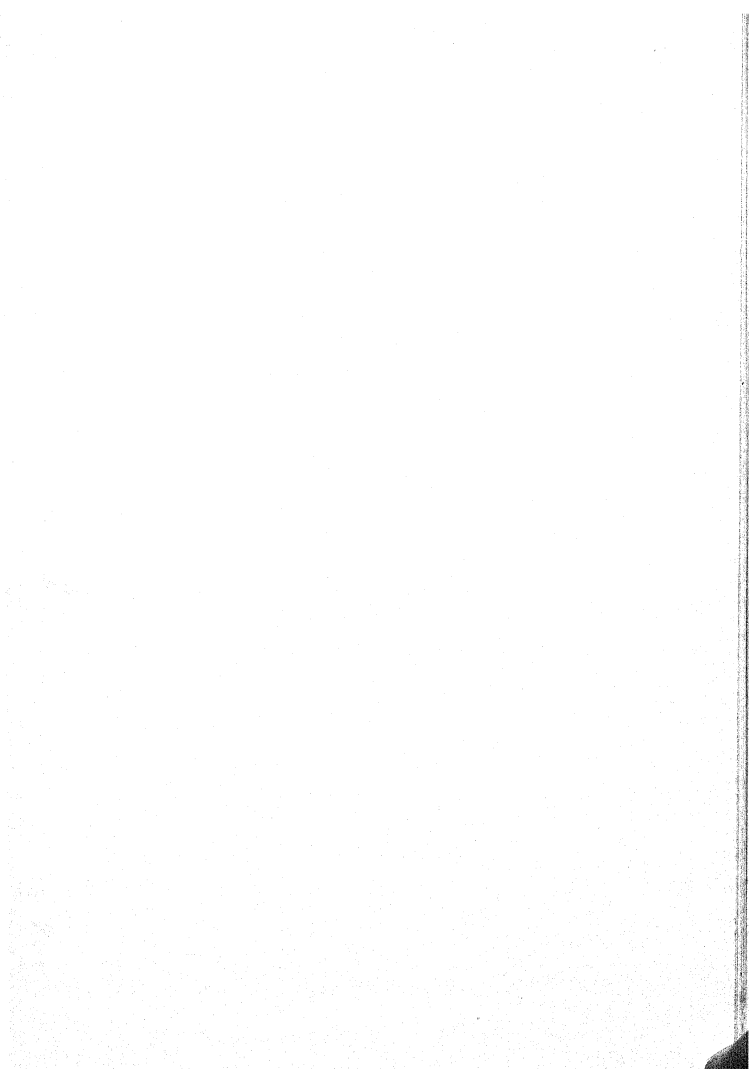


TABLE 14

RAILROAD COMMON STOCK PRICE RELATIVES,
JANUARY 1857-JANUARY 1936

The numbers at the heads of columns are the numbers assigned to the various railroads in Chart 32. For example, the figures of Column 1 refer to the Baltimore and Ohio Railroad. The figures in the single column entitled '51 to 52' refer first to the Chicago, Milwaukee and St. Paul Railway (January 1874 to January 1928) and then (lower down) they refer to the Chicago, Milwaukee, St. Paul and Pacific Railroad (January 1928 to January 1936).

Each relative price in Table 14 is the ratio of the average price of a specified stock in a particular January to the average price of the same stock in the preceding January, after all adjustments have been made for stock dividends, rights, assessments, etc. For example, the first number in the table is .5855. This means that the average price of Baltimore and Ohio Railroad common stock in January 1858 was a little less than three-fifths (.5855) its average price in January 1857.

The blank spaces in the table correspond to periods in which particular stocks were not used in constructing the stock price index numbers.

TABLE 14—RAILROAD COMMON STOCK PRICE RELATIVES

January Dates	1	2	3	4	5	6	7	8	9	10	11
1857-1858	.5855		.9201	.8093	.6706		.6176		1.0464	.9402	1.0664
1858-1859	1.1841		.9098	1.1551	.8968		1.0337		1.1746	1.2685	1.0551
1859-1860	1.2045		.9235	1.0909	.7766		.8947		1.0593	.9947	1.2100
1860-1861	.8469		.9619	1.5000	1.0483		1.0294	1.0985	1.0500	1.0932	1.2523
1861-1862	.9606		.9965	.9039	.9289		.7566	1.0713	.9671	.9634	.8092
1862-1863	1.7239		1.4236	1.8164	2.2465		1.7191	1.4901	1.2084	1.4028	1.7640
1863-1864	1.2056		1.4253	1.4662	1.5063		2.5704		.9767	1.0297	.9592
1864-1865	1.0585	.8137	1.2703	1.1463	1.1064		.9166		.9941	1.2832	1.0588
1865-1866	1.0266	.9055	.8284	.6868	.9292		1.2613		.9281	.9891	.9647
1866-1867	1.0426	.8838	1.0469	.9505	1.0012		1.1424	1.0686	1.1225	1.1639	1.0864
1867-1868	1.0967	1.3280	1.0016	.8369	.9450		.8221	.9317	1.0116	1.0498	1.0383
1868-1869	.9451	1.1324	.8714	1.0790	1.1130		1.0745	.9881	1.0191	1.0123	1.0347
1869-1870	1.0447	.6998	.9515	.8736	1.0678		1.0551	.8452	1.0668	.9789	.9990
1870-1871	1.0804	1.2817	.9755	.9947	1.0404		1.3280	1.0607	1.0278	.9738	1.0380
1871-1872	1.0681	1.4184	1.0156	1.0067	1.1482		1.0797	1.0780	1.0387	1.0817	.8877
1872-1873	1.0688	1.0440	.9641	.9282	1.0055		1.1205	.9255	.9022	.9730	.9783
1873-1874	1.0193	.6991	1.0600	1.0515	.9835		.9542	.9854	.8353	.9545	.7489
1874-1875	1.2053	.8908	.9602	1.0515	.9822		1.1585	1.0544	1.1094	.8512	.7062
1875-1876	.9070	.6961	1.0671	1.1064	.9650		1.0177	.9883	.9350	.7978	.2192
1876-1877	.8764	.3303	.5350	.6074	.3149		.9177	.2802	.9229	.8614	.4561
1877-1878	.6018	1.1382	.7472	.6860	.9815		.7630	.5424	.9888	1.2067	.8527
1878-1879	1.0747	1.2414	.8504	.9952	.8139		1.0476	2.4843	1.1135	1.1416	2.5990
1879-1880	1.7430	3.1967	1.8289	1.7338	2.5598			2.0549	1.0902	1.0044	2.5639
1880-1881	1.2451	1.3253	1.3065	1.3574	.8690			1.0802	1.2365	1.1064	1.2241
1881-1882	1.0294	.8726	1.0730	1.0760	1.0426			1.0539	.9848		.9380
1882-1883	1.0254	.9210	1.0146	1.0170	.8763			.7783	1.0335		1.0624
1883-1884	.9912	.7139	.9838	.9301	1.0012			1.1987	1.0673		.9722
1884-1885	.8496	.7485	.6596	.7360	.3077			.4186	1.0700		1.2277
1885-1886	1.1013	1.3286	1.3131	1.3829	1.2379			1.2117	1.0814		1.6661
1886-1887	.9191	1.1424	1.1179	1.1269	1.8493			1.4077	1.1238		1.6819
1887-1888	.6173	.9036	1.0426	.9659	1.6692			1.2552	1.0060		.8941
1888-1889	.8456	.9117	1.2517	1.0854	.9764			1.2526	.8500		
1889-1890	1.1207	.9881	1.1156	.9604	.7781			1.2656	1.1771		
1890-1891	.9298	.8760	.9799	.9909	.8650			.9087	1.0998		
1891-1892	1.1564	1.2145	.9367	1.0593	1.2323			1.0278	.8836		
1892-1893	1.0698	1.0191	1.0624	1.0659	1.2671			1.1174	1.0693		
1893-1894	.7216		.9805	1.0869	.3754			.8910	.7507		
1894-1895	.9320		1.0079	.9778	.5686			.7854	1.2612		
1895-1896	.6351		.9623	.9877	.2504			1.1363	1.0100		
1896-1897	.4005		.9143	.9637	.6662			.9901	.9879		
1897-1898	.8122		.9863	.9924			.8386	.9417	1.0335		
1898-1899	1.6169		.9961	1.0445			1.0170		1.0725	1.0088	
1899-1900	1.0233		1.0363	1.1064				1.1776	1.1682		
1900-1901	1.5185		1.2448	1.1023				1.3026	.9712		
1901-1902	1.1904		1.2308	1.3826				1.2650	.9897		
1902-1903	.9948		.9883	.9990				.9567	1.0021		
1903-1904	.7960		.9438	1.0000			.7079	.8750	.8707		
1904-1905	1.2717		1.1256	1.2615			1.8535	1.1945	1.0426		
1905-1906	1.1102		1.2212	1.3699			1.7608	1.1725	.9936		
1906-1907	1.0323		.9847	1.0629			.8663	.9482	.9251		
1907-1908	.7248		.7233	.9293			.7939		.8093	.8434	
1908-1909	1.2894		1.1319	1.1923			1.3449		1.3332	.9982	
1909-1910	1.0566		1.0000	1.2474			1.1801		1.3189	1.0899	
1910-1911	.9170		.9337	.8962			.9485		.8832	.8037	
1911-1912	.9791		1.0214	1.0877			.9964			.8507	
1912-1913	.9927		.9735	1.0474			1.0703			.9624	
1913-1914	.8956		.9343	.9011			1.0290			.5104	
1914-1915	.7593		.9507	1.0402			.8760			.5612	
1915-1916	1.2906		1.0349	1.0862			1.0757		1.3456		
1916-1917	.9049		.9914	1.0491			1.2624		1.1148		
1917-1918	.6303		.7253	.7447			.7295		.5212		
1918-1919	.9018		.9417	1.0249			1.0849		1.3839		
1919-1920	.6862		.9181	1.0125			.9545		1.1765		
1920-1921	1.1125		1.0668	1.1784			1.1182		.6714		
1921-1922	.9599		1.0750	1.0585			.8583		.6489		
1922-1923	1.2957		1.0167	1.0897			1.0676		1.1601		
1923-1924	1.3195		.9932	.8905			.8639		.6077		
1924-1925	1.3568		1.2741	1.2584			1.3712		1.5059		
1925-1926	1.1352		1.1434	1.0491			1.1099		2.7868		
1926-1927	1.1921		1.0952	.9680			1.1262		1.1636		
1927-1928	1.0779		1.0322	1.1591			1.0370		1.0948		
1928-1929	1.0506		1.0995	.9528			1.0866		1.7382		
1929-1930	.7877		.8474	1.0707			1.1521		.9912		
1930-1931	.6472		.8690	.6535			.6860		.6106		
1931-1932	.2273		.5103	.2582			.4170		.2026		
1932-1933	.5750		.6929	1.0187			.7769		.7514		
1933-1934	2.7329		1.2181	1.1328			1.7132		1.6506		
1934-1935	.4804		.6242	.6291			.8054		.4510		
1935-1936	1.3633		1.0206	.9783			.9985		1.4252		

RAILROAD STOCK PRICES

A183

JANUARY 1857 TO JANUARY 1936

12	13	14	15	16	17	18	19	20	21	22	January Dates
.7232			.7368			.6819			.8480	.6011	1857-1858
.8548			.7395			.8963			1.0747	1.7583	1858-1859
1.0464			1.2630			.9353			.8695	1.2437	1859-1860
.9177			1.4269			1.1158			1.0760	1.1151	1860-1861
.9224			.7669			.9782			1.0363	.8312	1861-1862
1.6947			1.4302			1.3400			1.4181	2.3227	1862-1863
1.5209			1.3409	1.6807		1.2289	2.6026		1.1524	1.5125	1863-1864
.7126			1.0193	.6860			.7143			.8270	1864-1865
1.0600			1.1382	.7952			.8759			.9903	1865-1866
1.2379			.9245	1.0529			1.2362		1.1087	1.2238	1866-1867
.9904			1.1706	1.5035			1.7002			1.1956	1867-1868
1.3056			1.1468	.7824			1.5101			1.2826	1868-1869
.8274			.9788	.5900			.8581			1.1202	1869-1870
1.0179			.9829	1.2505			1.0273				1870-1871
1.0235			.9605	.7735			.9710				1871-1872
1.0275			.9408				1.1596				1872-1873
.9241			.8235				.7280				1873-1874
.9976			.9803				.7672				1874-1875
1.0375			.9962				.8870				1875-1876
.9463			.5852				.8805				1876-1877
.9821			1.2776				1.0035				1877-1878
1.2414	1.5279		1.1382				1.5974				1878-1879
1.2246	2.4683		1.2131				1.5783				1879-1880
.8281	1.3277		1.2636		1.4727		1.4282	.9697			1880-1881
.9620	1.0812		1.0212		1.0617		.9841	.7475			1881-1882
.6408	.9910		.0912		.7572		1.0435	1.4308			1882-1883
.9326	.9091		1.0280		.5301		.8700	.5997			1883-1884
.9170	.7212		.8998		.9298		.7598	.8245			1884-1885
1.2045	1.3864		1.1537		1.5470		1.2238	1.5136			1885-1886
.9767	.6667		.9544		1.6099		1.0493	1.2665			1886-1887
.8982			.9475		.6364		.9596	.8086			1887-1888
.8717			.9644		1.1161		.9931	.8188			1888-1889
.9797			1.0349		.8426		1.0297	1.0404			1889-1890
.7269			.8444		.8182		.9594	.7482			1890-1891
1.3020			1.0834		1.3065		1.0993	1.8789			1891-1892
.9390			.9333		.8212		.9690	1.0619			1892-1893
.7589			.8990		.2428		.8903	.6997			1893-1894
.9579			.9376		.7953		.9485	.9291			1894-1895
1.0532			1.0942		.9231		1.0209	1.0459			1895-1896
1.0342			1.0028				1.0619	1.4525			1896-1897
1.3431			1.1259				1.1880	1.5087			1897-1898
1.3948			1.1160				1.1918	1.2773			1898-1899
.9054			.9544				1.0977	1.2697			1899-1900
1.1521			1.1744				1.0700	1.0802			1900-1901
1.3721			1.0735				1.2173	1.0693			1901-1902
1.3459			1.1468				1.0332	1.1453			1902-1903
	.4752		.8881				.8113	.9006			1903-1904
	1.4987		1.1885				1.3552	1.2930			1904-1905
	.6898		1.1355				1.1156	1.0347			1905-1906
	1.1158		.9270				.9167	.8505			1906-1907
	.5293		.7758				.8214	.7742			1907-1908
	1.7061		1.1692				1.2465	1.2173			1908-1909
	1.9222		.9914				.9791				1909-1910
	.6558		.9341				.9017				1910-1911
	.7812		1.0399				.9768				1911-1912
	.9210		.8903				.9634				1912-1913
	.6463		.8898				.9652				1913-1914
	.0554		.9775				.9545				1914-1915
.9574			.9885				1.0493				1915-1916
1.8055			.9842				.9256				1916-1917
.4167			.8905				.7677				1917-1918
1.1825			1.0332				1.0114				1918-1919
1.1107			.9203				.9024				1919-1920
1.0186			.9957				.7977				1920-1921
1.1545			1.1236				.9093				1921-1922
1.0433			1.1176				1.2871				1922-1923
.7642			.9195				.6385				1923-1924
1.8523			1.1358				1.4253				1924-1925
1.2266			1.0375				1.0619				1925-1926
1.2500			1.0118				1.0486				1926-1927
1.5320			1.1286				1.0602				1927-1928
1.2276			1.0271				1.0358				1928-1929
.8632			.9133				.9641				1929-1930
.4868			.6106				.4493				1930-1931
.2206			.1753				.2418				1931-1932
.3714			.9366				.5306				1932-1933
.8528			2.5531				1.8603				1933-1934
.5711			.4577				.5441				1934-1935
.9772			1.3904				.7500				1935-1936

A185

34	35	36	37	38	39	40	41	42	43	44	January Dates
	.8959					82.40		1.775			1857-1858
	1.0515					1.0817		9500			1858-1859
	.9434					.8723		7242			1859-1860
	1.0464					1.0184		1.4362			1860-1861
	1.1458					1.0097		1.6316			1861-1862
	1.4635					1.6734		4.0170			1862-1863
	1.1179					1.1074	1.2584	1.7374		1.2067	1863-1864
	1.1668					.9796	1.1207	.8022		1.1855	1864-1865
	.6657					.8672	1.0170	.8947		.8626	1865-1866
	.9274					1.0158	1.0102	1.0332		1.0414	1866-1867
	.9224					1.0198	1.0202	1.1161		.9287	1867-1868
1.0371	.8968					1.0799	1.1752	1.0676		1.1294	1868-1869
1.0051	1.0271					.0049	1.3086	1.1205		.8924	1869-1870
1.0887	1.1184					1.1335		1.1981		.9571	1870-1871
.9811	1.0767					.9875		1.2193		.9503	1871-1872
.9882	1.0259					.9643				.9796	1872-1873
.9448	.8507					.9637				.8472	1873-1874
.9712	.8622					1.1277				1.0457	1874-1875
.9806	.8800					1.0014				1.0634	1875-1876
.9565	.6118					.8755				.7111	1876-1877
.9615	.9964					.6554				.6250	1877-1878
1.0760	1.1474					1.0696				.8345	1878-1879
1.0696	1.9156		8.4411			1.5364				2.4615	1879-1880
1.1245	1.1709		1.0728			1.3512				1.3893	1880-1881
.9821	.8715		1.0544			.9252				1.0619	1881-1882
1.0578	.9938		.9435			.9974			1.2255	1.1089	1882-1883
1.1182	.7826		.6311			.9700			1.0702	1.0812	1883-1884
.9646	.5079		.4155			.8632				.9664	1884-1885
1.0522	1.7266		1.9802			1.0595			1.2682	1.2817	1885-1886
1.1511	1.1403		.7475	1.1709		1.0457			1.1447	1.0852	1886-1887
.9925	.8333		.4786	.6627		.9776			.9574	1.2294	1887-1888
1.0214	1.1285		.7553	1.0483		.9930			1.0235	.8902	1888-1889
1.0704	1.4233		1.8109	.8271		1.0000			.9743	.9229	1889-1890
1.0342		.8745	.6887	1.2921		.9436			.9707	.9359	1890-1891
1.0095		1.1385	1.4488	1.1943		1.0965			1.1048	1.0418	1891-1892
1.0529		.8047	.8793	.9816		.9744			1.1636	1.0108	1892-1893
.9603		.5893	.7419	.6516		.9129			.8873	.9711	1893-1894
1.0321		1.1089	.9855	.8577		1.0228			.8692	.9777	1894-1895
1.0067		.8903	.8641	.9855		1.0351			.9609	1.0266	1895-1896
.9952		.8309	1.1744	.7436		1.0072			.5873	1.0009	1896-1897
1.0585		1.2656	1.3222	.5248		1.1174			.8205	1.1471	1897-1898
1.1363		1.4578	1.2249	.4756		1.1220			1.6719	1.1741	1898-

TABLE 14—RAILROAD COMMON STOCK PRICE RELATIVES

January Dates	45	46	47	48	49	50	51 & 52	53	54	55	56
1857-1858			.8182	.4073				.5889			
1858-1859			1.4132	.4098				.8697			
1859-1860			.8942	1904				.7730			
1860-1861			1.2957	5.2012				1.8001			
1861-1862			1.0849		1.6155			.8299			
1862-1863			1.3274		2.0749			2.1111			
1863-1864			1.3219		1.3855			1.4099			
1864-1865			.8834		.7261			1.0421			
1865-1866			.8354		.9289			1.1447			
1866-1867			1.0363			.8578		1.1692			
1867-1868			.8066			1.2391		1.2942	.9825		
1868-1869			1.0740			1.4679		1.3677	1.7857		
1869-1870			.9594			1.1479		.9339	1.1051		
1870-1871			1.1316			.8015		1.0067	.7783		
1871-1872			1.0207			1.1008		.9442	.6221		
1872-1873			.9715			.9316		.9360	.8995		
1873-1874			.9968			.8674		.8442	.6403		
1874-1875			1.0325				.8228	1.0812	.7264		
1875-1876			1.0264				1.0332	1.0534	.9245		
1876-1877			.7652				.4895	1.0174	.6824		
1877-1878			.8446				1.9907	.8736	.8230		
1878-1879			.8618				1.0955	1.1125	1.2377		
1879-1880			1.4914				1.8741	1.2598	2.6345	6.4032	
1880-1881			1.1264				1.4990	1.4578	1.3465	1.0330	.9822
1881-1882			1.0498				.9671	.8622	1.8763	1.0141	.7632
1882-1883			1.0351				1.1371	.9316		1.3721	1.3909
1883-1884			1.1102				.8424	.9822		.4681	.7865
1884-1885		.6993	.8482				.8241	.9930		.7045	.7327
1885-1886	1.7648		.9698				1.2694	1.1687		1.6823	1.7330
1886-1887	1.2394		1.0044				.9558	1.0023		1.0000	1.4747
1887-1888	.7857		.9823				.8493	.9369		.8134	1.2017
1888-1889	1.0634		.9865				.8391	.8498		1.1647	.6468
1889-1890	1.1156		.9633				1.0935	.9767		1.2382	.8392
1890-1891	.8210		.9432				.8201	.8371		.8787	.7444
1891-1892		2.0086	1.0188				1.4122	1.2100		.9612	1.8811
1892-1893		.7105	1.1671				.9914	.9250		.6946	.9583
1893-1894		.6637	.6420				.7181	.7533		.2652	.5365
1894-1895		1.1532	.9035				.9738	.9389		.7127	.8177
1895-1896		1.0445	1.0671				1.2184	1.0600		1.1722	1.3070
1896-1897		.8184	.8043				1.1038	.9750		.4068	.8307
1897-1898		3.1089	.8417				1.2656	1.3580		1.7081	1.0705
1898-1899		1.8450	1.0325				1.3170	1.3348		1.9616	1.7914
1899-1900		.9572	.9755				.9391	.9339		1.0927	1.3020
1900-1901		.8179	1.2671				1.2957	1.1790		1.5963	
1901-1902		1.4391	1.1617				1.1156				
1902-1903		1.0745	1.1355				1.0930				
1903-1904		.7052	.8894				.8036				
1904-1905		1.1869	1.5035				1.2098				
1905-1906		1.1071	1.4652				1.0661				
1906-1907		.8879	.9048				1.0824			.9626	
1907-1908		.8522	.7837				.7315			.7828	
1908-1909		1.3916	1.2782				1.3483			1.1374	
1909-1910		1.0975	1.4125				1.0172			.9889	
1910-1911		1.0018	1.0292				.8349			.8660	
1911-1912		1.0235	.9712				.8506			.9797	
1912-1913		1.0100	.9485				1.0536			1.0202	
1913-1914		.8358	.9304				.9050			.9442	
1914-1915		.8299	.8867				.8749			.9130	
1915-1916		1.1413	1.1676				1.0942			1.1130	
1916-1917		1.0032	.9920				.9075			.9403	
1917-1918			.7312				.4959			.7830	
1918-1919			.9727				.8718			1.0797	
1919-1920			.7705				.9548			.8703	
1920-1921			1.2674				.7953			1.0605	
1921-1922			1.0785				.6256			.9017	
1922-1923			1.1763				1.2274			.9712	
1923-1924			.9692				.7039			.7137	
1924-1925			1.9156				.9326			1.3161	
1925-1926			1.0549				.8400			1.0632	
1926-1927			1.3549				.8441			1.1031	
1927-1928			.8315				1.7857			1.1833	
1928-1929			1.0595				1.4844			1.1386	
1929-1930			.7335				.6856			.7826	
1930-1931			.7849				.2846			.6290	
1931-1932			.2456				.3541			.3503	
1932-1933			.9064			52	.7520			.8020	
1933-1934			1.3097				3.0585			1.7281	
1934-1935			.5945				.4556			.7333	
1935-1936			.9423				.8092			1.3345	

RAILROAD STOCK PRICES

A187

JANUARY 1857 TO JANUARY 1936.

57	58	59	60	61	62	63	64	65	66	67	January Dates
		.9419			1.0271						1857-1858
		1.0750			1.1492						1858-1859
		1.0226			1.0624						1859-1860
					.9993						1860-1861
					.9886						1861-1862
					1.2921						1862-1863
					1.1615		1.4031			1.1413	1863-1864
					1.0500		1.0430			.8947	1864-1865
					.8330		1.1487				1865-1866
					.9763		1.3970				1866-1867
		1.1869			.8903		1.2328				1867-1868
		1.0952			1.0889		1.2092				1868-1869
		.9114			1.0065		.9698				1869-1870
		1.0605			.9981		1.0585				1870-1871
		.9879			1.1329		1.0479				1871-1872
		.9670			1.0462		.9440				1872-1873
				.9000	.9807		.9363				1873-1874
				1.0715	.9724		.9883				1874-1875
				1.1000	.9826		.9691				1875-1876
				1.0219	.9688		.9878				1876-1877
				1.0174	.9263		.7704				1877-1878
				1.0330	1.0304		1.0772				1878-1879
				.9797	1.1218		1.2520				1879-1880
				1.1403	1.1620		1.4568				1880-1881
1.2546				.9785	.7531		.8623				1881-1882
1.2779				1.0069	1.0872		1.0583				1882-1883
.8680				1.0290	1.0235		.4810				1883-1884
.9113				1.0028	1.0580		.9062				1884-1885
1.3351				1.1556	1.0867	1.7390	1.0897				1885-1886
1.0354				1.0481	1.1228	.9375	1.0151				1886-1887
.9696				1.0186	.9756	.9365	.9547				1887-1888
.9060				1.1358	.9736	.9505	1.0074	1.0549			1888-1889
1.1771				1.1125	1.0294	1.1647	.9710	.9690			1889-1890
	1.0233			1.0612	.9516	.8359	.9636	.7108			1890-1891
	1.6151			.9711		1.2578	1.0902	1.6680			1891-1892
	1.2170			1.1490		.9237	1.0373	.9214			1892-1893
	.7764			.6178		.9509	.7945				1893-1894
	1.0000			.0599		1.0486	1.1023	.8637			1894-1895
	1.1133			1.0186		.8721	1.0476	.9908			1895-1896
	1.0664			.9840		1.0580	1.0715	.9277			1896-1897
	1.1202			1.0525		1.1251	.9996	1.1866			1897-1898
	1.9147			1.0792		1.2903	1.0306	1.1795			1898-1899
	1.0691			1.0678		1.0172	.9861	.7701			1899-1900
	1.1782			.9904		1.4421	1.1593	1.6199			1900-1901
	1.0874			.9941		1.0904	.9009	2.3388	1.6737		1901-1902
	1.0957			1.0597		.9657	1.0160	.8731	1.5206		1902-1903
	.8639			.8747		.6773	1.0000	.6832	.8851		1903-1904
	1.3842			1.0275		1.8867	1.1695	1.5063	1.3586		1904-1905
	1.2844			1.0273		1.2674	.8146	1.3707	1.0486		1905-1906
	1.9116			.9287		.8376	.7634	.8741	.8509		1906-1907
	.7321			.7411		.7537	.5288	.4793	.4514		1907-1908
	1.1992			1.1992		1.3759	4.7457	1.8374	3.4562		1908-1909
	.9502			1.0055		.9934	.9549	1.583	.9814		1909-1910
	.9190			.9584		.8919	.4815	1.0445	.4637		1910-1911
	1.0242			.9215		.9056	.5833	.9225	.5918		1911-1912
	1.0454			.9325		.8580	.9966	1.0188	.8889		1912-1913
	.9976			.5867		.8881	.6055	.6805			1913-1914
	.8952			.7020		.8004	.8883	.8606			1914-1915
	1.0688			1.3490		1.2411	1.1194	1.2112			1915-1916
	.9448			.6460		.9741	1.8151	.8460			1916-1917
	.7639			.6536		.7084	.4690	.4123			1917-1918
	1.0435			1.0083		1.0000	.8322	1.9333			1918-1919
	.8533			.8788		.8547	1.0337	.9827			1919-1920
	.9724			.7873		1.1031	1.0404	1.6842			1920-1921
	.9359			.6828		1.1277	.4225	1.1251			1921-1922
	1.0191			1.3561		.9495	.7396	1.5000			1922-1923
	.7755			.8944		.9248	1.7002	.9687			1923-1924
	1.2238			1.7632		1.3630	1.9552	1.6244			1924-1925
	1.0869			1.3983		1.0700	.9483	1.3848			1925-1926
	1.1082			1.0421		.9717	.8096	1.0715			1926-1927
	1.1474			1.4533		1.1199	1.1914	1.5173			1927-1928
	1.1419			1.3777		.9723	2.0186	1.0534			1928-1929
	.8785			1.2584		.5032		.9777			1929-1930
	.6613			.7576		.4675		.6097			1930-1931
	.3216			.2966		1.1121		.0827			1931-1932
	.4621			.6219		1.2850		.4267			1932-1933
2.5526				1.2123		.9874		6.2917			1933-1934
.6392				.4009		.5826		.6209			1934-1935
2.1858				.6384		1.1127		2.0720			1935-1936

TABLE 14—RAILROAD COMMON STOCK PRICE RELATIVES

January Dates	68	69	70	71	72	73	74	75	76	77	78
1857-1858											
1858-1859											
1859-1860											
1860-1861											
1861-1862											
1862-1863											
1863-1864											
1864-1865											
1865-1866		.8235									
1866-1867	1.0104										
1867-1868		1.0544									
1868-1869	1.4135										
1869-1870		.8360									
1870-1871		.9586									
1871-1872	1.4511					1.5353					
1872-1873	1.0009					1.8231					
1873-1874		.7123				.7848					
1874-1875		.3410				.5943					
1875-1876		.2690				.5752					
1876-1877	1.3763					.6048				.7069	
1877-1878		2.4077				.8697				.6594	
1878-1879		1.4309				1.8806				.5462	
1879-1880		2.7315								2.3036	
1880-1881			1.0275				1.8531			3.4922	
1881-1882			.7796				1.1153			1.0762	1.0195
1882-1883			.9412				.8119				1.0146
1883-1884			.4725				.9678				.8319
1884-1885			.3027				.6699				.4498
1885-1886			.2151				.5163		.4392		.7001
1886-1887			.7530				1.8497		3.5826		1.0104
1887-1888			.9390				1.2856		1.6259		1.7386
1888-1889			.8452				.8743		.7600		1.0512
1889-1890			1.2601				.9890		.9737		1.0116
1890-1891			.7671				.9600		.8514		1.0181
1891-1892			1.3636				.7563		1.1495		.7032
1892-1893			.8179				1.6029		1.3521		.8800
1893-1894			.5869				.7715		1.6432		.7603
1894-1895			.8978				.5780		.7737		.7905
1895-1896			1.1138				.7086		.9209		1.0937
1896-1897			.9807				.8096		.7248		.9006
1897-1898			1.1043					.9960	.8827		1.1978
1898-1899			1.1463					.9786	1.4639		1.2246
1899-1900			.8807					1.0259			1.5951
1900-1901			1.7195					.7707			.8406
1901-1902			.7824					2.4055			1.7018
1902-1903			1.3400					1.4832			1.4784
1903-1904			.6744					.9804			1.0578
1904-1905			1.0426					.6971			.6274
1905-1906			1.0972					1.4588			1.3286
1906-1907			.7404					1.1855			1.0488
1907-1908			.5453					.7988			.9481
1908-1909			1.9861					.4093			.5738
1909-1910			1.2735					1.9879			1.7902
1910-1911			.6751					.9861			.9505
1911-1912			.4107					.9021			.7957
1912-1913			.5468					1.1130			.8099
1913-1914			1.0000					.9959			.9884
1914-1915			.3287					.9562			.7095
1915-1916			.1764					.7570			.8267
1916-1917					.9680			1.7378			.7000
1917-1918					.5622			.8268			2.1004
1918-1919					.9553			.4806			.9456
1919-1920					.9778			1.0404			1.8302
1920-1921					1.0390			.8037			1.2162
1921-1922					.7806			1.0673			.5025
1922-1923					1.4161			.6370			1.3731
1923-1924					1.3225			1.2523			.8036
1924-1925					1.8084			2.1637			.9767
1925-1926					2.1752			1.3428			2.1548
1926-1927					.9300			1.1471			1.3008
1927-1928					1.4662			1.1249			.9521
1928-1929					1.1700			1.5097			1.9372
1929-1930					.7292			1.1092			1.5820
1930-1931					.3896			.8208			.7022
1931-1932					1.1107			.5431			.8254
1932-1933					.7605			.2419			
1933-1934					1.9668			.7546			
1934-1935					.5787			3.2278			
1935-1936					1.5485			1.0563			

TABLE 14—RAILROAD COMMON STOCK PRICE RELATIVES

January Dates	90	91	92	93	94	95	96	97	98	99	100
1857-1858											
1858-1859											
1859-1860											
1860-1861											
1861-1862											
1862-1863											
1863-1864											
1864-1865											
1865-1866											
1866-1867											
1867-1868											
1868-1869											
1869-1870											
1870-1871											
1871-1872											
1872-1873											
1873-1874											
1874-1875											
1875-1876											
1876-1877			8803								
1877-1878			1,0691								
1878-1879			9430								
1879-1880			1,4434				4,5941				
1880-1881	8048		1,2975				9871		2,0040		
1881-1882	1,2117		9926				1,4385		8100		
1882-1883	7192		8666				5437		7690		
1883-1884	8466		7309				5000		8413	9119	
1884-1885	6863		6495	1,0242			8110		9274	7326	
1885-1886	1,3715		1,0829	1,5167			2,1242		1,7084	1,6014	
1886-1887	1,7685		1,1282	1,2665			1,0780		1,1405	1,0000	
1887-1888	9189		9680	5373			6678		7323	9057	
1888-1889	1,0637		1,1174	2,6638			7024		9381	8777	
1889-1890	1,2360		1,0539	1,1773			1,9165		2,1483	1,4545	
1890-1891	9171		6695		4060	7216	1,7595		6122	9761	
1891-1892	1,0093		1,0624		1,4223	1,6372	1,4019		9290	1,2382	
1892-1893	9888		8513		7561	8552	9169		7773	9672	
1893-1894	7955		4641		2232	6399	4902		3278	8125	
1894-1895	9571		5380		9403	8355	8875		6120	7674	
1895-1896			5280		1,1269	1,1426	1,5027		1,1439	9796	
1896-1897			1,5094			6962	9565		6057	1,0233	
1897-1898			9569			1,4282	1,3690		1,1225	1,5754	
1898-1899			2,1067			1,8437	1,2014		8908	9850	
1899-1900			1,0134			9675	1,0985		6492	1,0822	1,5918
1900-1901			1,7877			1,2081	1,4325		8667	9704	9294
1901-1902			1,2272			1,3375		1,6248	1,2425	1,2700	2,1622
1902-1903			1,0049			1,0937		1,0639	1,3434	1,2252	1,6827
1903-1904			7738			7493		5979	7076	8779	5432
1904-1905	1,3462		1,4911			1,4025		1,6226	1,2048	1,1692	1,5244
1905-1906	1,3262		1,3044			1,0462		1,1434	1,3192	1,3068	1,3944
1906-1907	7985		1,1405			1,3465		7489	7931	1,1825	8571
1907-1908	5650	6959				8002		3800	6565	8637	4444
1908-1909	1,5293	1,4693				1,5940		2,3286	2,5545	1,1395	2,2652
1909-1910	1,2037	1,0785				1,1082		1,1992	1,2142	1,0882	9251
1910-1911	9125	8969				8891		8720	1,2145	1,1293	7086
1911-1912	1,1308	9641				9370		1,0254	8862	1,1803	7736
1912-1913	9853	9490				9755		9842	9056	1,1251	8977
1913-1914	9259	9984				8758		9135	9467	8765	6012
1914-1915	8512	9315				9074		6369	8019	7593	1,0081
1915-1916	1,1021	1,1379				1,1874		1,3788	1,0186	1,0817	1,1000
1916-1917	1,0351	1,0700				9586		1,4223	1,4061	9178	9782
1917-1918	7723	7840				8542		7428	7329	8890	
1918-1919	1,0723	1,1179				1,2017		1,1822	8528	1,1125	
1919-1920	9364	9671				1,0278		7982	9255	8224	
1920-1921	9335	9723				9645		1,0710		8952	
1921-1922	1,0191	1,0673				1,0127		7691		1,0464	
1922-1923	1,3071	1,0740				1,0857		1,5314		1,1655	
1923-1924	1,0055	9449				9832		1,5385		1,0384	
1924-1925	1,3131	1,1604				1,1987		1,8315		1,0134	
1925-1926	1,6661	9771				9703		1,4812		9925	
1926-1927	8260	1,1015				1,0624		1,0622		1,1218	
1927-1928	9788	1,1768				1,1210		1,1758		1,2781	
1928-1929	9559	1,1522				1,0916		1,0514		1,1704	
1929-1930	9532	9983				9128		8476		8165	
1930-1931	6696	8620				8174		4287		8370	
1931-1932	2967	4021				3170		1855		3298	
1932-1933	6141	9712				5558		5737		9345	
1933-1934	2,1951	1,6220				1,4157		5,0493		1,1696	
1934-1935	7307	8841				6910		4800		8591	
1935-1936	9392	1,0946				1,5756		1,0526		9414	

JANUARY 1857 TO JANUARY 1936

[illegible]

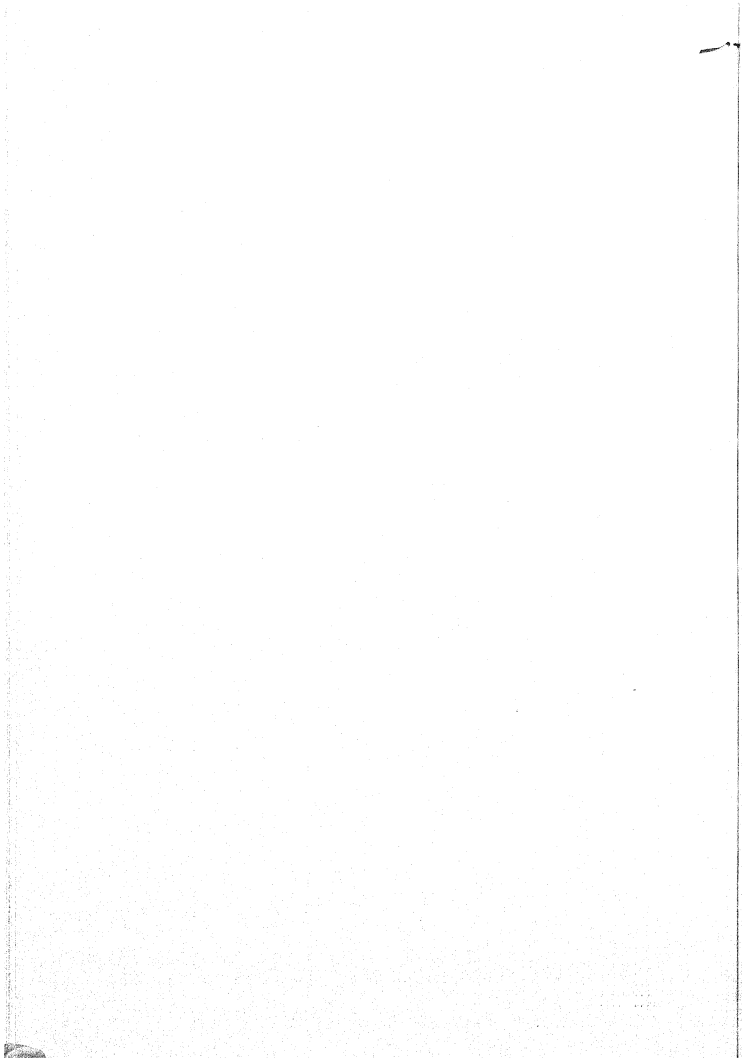


TABLE 15

RAILROAD COMMON STOCK WEIGHTS,
JANUARY 1857-JANUARY 1936

The numbers at the heads of columns are the numbers assigned to the various railroads in Chart 32. For example, the figures of Column 1 refer to the Baltimore and Ohio Railroad. The figures in the single column entitled '51 and 52' refer first to the Chicago, Milwaukee and St. Paul Railway (January 1874 to January 1928) and then (lower down) they refer to the Chicago, Milwaukee, St. Paul and Pacific Railroad (January 1928 to January 1936).

Each weight in Table 15 is the ratio of the market value of the total outstanding common stock of a specified railroad in the earlier January of the thirteen months designated in column 1 to the market value of the total outstanding common stock of all the railroads whose stocks in that particular thirteen months' period were used in constructing the railroad common stock price weighted index number. For example, the first figure in the table is .0587. This means that the market value of the total outstanding common stock of the Baltimore & Ohio Railroad in January 1857 was .0587, or a little less than one-seventeenth, of the market value of the total outstanding common stock of all the 27 railroads whose stock prices were used for constructing the railroad stock price index in the period January 1857 to January 1858 inclusive.

From this definition of the meaning of the figures in the table it follows that, for any particular thirteen months' period, the sum of the weights equals unity.

Though the January figures for the weighted index number of railroad stock prices given in Table 16 might be calculated perfectly from the price relatives of Table 14 and the weights of Table 15 they were not in fact so calculated. If from January to January each year, a chain weighted arithmetic average of relative prices index number were constructed by using the relative prices of Table 14 and the weights of Table 15, the movements of such an index number could be shown to be identical with the movements of a chain weighted aggregate of actual prices index number where the prices were dollars per share and the weights were the number of shares outstanding in the earlier January. This latter is how the railroad common stock price weighted index number was actually constructed.

The blank spaces in the table correspond to periods in which particular stocks were not used in constructing the stock price index numbers.

TABLE 15—RAILROAD COMMON STOCK WEIGHTS

January Dates	1	2	3	4	5	6	7	8	9	10	11
1857-1858	.0587	.....	.0640	.0125	.0621	.....	.0066	.....	.0243	.0088	.0086
1858-1859	.0458	.....	.0784	.0135	.0550	.....	.0035	.....	.0339	.0110	.0110
1859-1860	.0524	.....	.0689	.0155	.0472	.....	.0054	.....	.0375	.0135	.0125
1860-1861	.0660	.....	.0665	.0271	.0383	.....	.0051	.0343	.0385	.0140	.0158
1861-1862	.0492	.....	.0571	.0364	.0332	.....	.0046	.0332	.0384	.0135	.0174
1862-1863	.0551	.....	.0568	.0333	.0353	.....	.0035	.0360	.0376	.0132	.0143
1863-1864	.0584	.....	.0492	.0397	.0454	.....	.0037	.....	.0277	.0113	.0159
1864-1865	.0469	.0255	.0464	.0459	.0735	.....	.0065	.....	.0179	.0077	.0108
1865-1866	.0492	.0217	.0584	.0782	.0760	.....	.0059	.....	.0176	.0098	.0113
1866-1867	.0501	.0182	.0479	.0533	.0704	.....	.0074	.0515	.0162	.0096	.0121
1867-1868	.0450	.0140	.0433	.0522	.0683	.....	.0073	.0504	.0157	.0096	.0123
1868-1869	.0412	.0156	.0542	.0383	.0565	.....	.0050	.0426	.0145	.0084	.0106
1869-1870	.0332	.0147	.0406	.0355	.0515	.....	.0046	.0361	.0127	.0073	.0097
1870-1871	.0346	.0105	.0386	.0413	.0578	.....	.0048	.0305	.0136	.0071	.0099
1871-1872	.0346	.0120	.0334	.0364	.0529	.....	.0054	.0310	.0135	.0062	.0096
1872-1873	.0319	.0153	.0306	.0351	.0622	.....	.0052	.0371	.0160	.0060	.0077
1873-1874	.0319	.0149	.0275	.0358	.0584	.....	.0055	.0321	.0137	.0055	.0081
1874-1875	.0336	.0108	.0388	.0390	.0596	.....	.0053	.0328	.0118	.0054	.0063
1875-1876	.0403	.0096	.0370	.0449	.0582	.....	.0063	.0352	.0130	.0046	.0044
1876-1877	.0359	.0065	.0388	.0489	.0552	.....	.0068	.0344	.0118	.0036	.0010
1877-1878	.0398	.0027	.0262	.0379	.0219	.....	.0079	.0122	.0138	.0039	.0005
1878-1879	.0284	.0034	.0214	.0284	.0235	.....	.0064	.0065	.0149	.0051	.0005
1879-1880	.0242	.0036	.0156	.0242	.0164	.....	.....	.0139	.0142	.0050	.0011
1880-1881	.0264	.0072	.0178	.0263	.0267	.....	.....	.0178	.0098	.0032	.0018
1881-1882	.0241	.0070	.0171	.0261	.0171	.....	.....	.0141	.0089	.....	.0016
1882-1883	.0252	.0062	.0187	.0286	.0181	.....	.....	.0151	.0089	.....	.0016
1883-1884	.0243	.0054	.0178	.0273	.0149	.....	.....	.0111	.0086	.....	.0016
1884-1885	.0267	.0043	.0228	.0281	.0167	.....	.....	.0147	.0102	.....	.0017
1885-1886	.0275	.0039	.0182	.0252	.0063	.....	.....	.0075	.0133	.....	.0025
1886-1887	.0239	.0041	.0197	.0275	.0071	.....	.....	.0071	.0113	.....	.0033
1887-1888	.0199	.0042	.0199	.0280	.0122	.....	.....	.0091	.0115	.....	.0050
1888-1889	.0129	.0040	.0217	.0283	.0211	.....	.....	.0119	.0121	.....	.....
1889-1890	.0113	.0038	.0283	.0320	.0165	.....	.....	.0156	.0107	.....	.....
1890-1891	.0114	.0033	.0283	.0275	.0115	.....	.....	.0177	.0113	.....	.....
1891-1892	.0117	.0032	.0340	.0301	.0110	.....	.....	.0177	.0224	.....	.....
1892-1893	.0107	.0033	.0264	.0265	.0114	.....	.....	.0181	.0212	.....	.....
1893-1894	.0108	.....	.0286	.0282	.0146	.....	.....	.0203	.0229	.....	.....
1894-1895	.0098	.....	.0357	.0390	.0069	.....	.....	.0230	.0218	.....	.....
1895-1896	.0093	.....	.0415	.0390	.0040	.....	.....	.0184	.0282	.....	.....
1896-1897	.0057	.....	.0384	.0369	.0049	.....	.....	.0201	.0273	.....	.....
1897-1898	.0022	.....	.0345	.0350	.....	.0162	.....	.0196	.0266	.....	.....
1898-1899	.0018	.....	.0315	.0321	.....	.0126	.....	.0171	.0254	.....	.....
1899-1900	.0147	.....	.0240	.0257	.....	.0098	.....	.0140	.0201	.....	.....
1900-1901	.0154	.....	.0238	.0275	.....	.0075	.....	.0188	.0259	.....	.....
1901-1902	.0241	.....	.0257	.0263	.....	.0109	.....	.0214	.0235	.....	.....
1902-1903	.0314	.....	.0242	.0279	.....	.0155	.....	.0209	.0179	.....	.....
1903-1904	.0448	.....	.0213	.0249	.....	.0160	.....	.0179	.0162	.....	.....
1904-1905	.0409	.....	.0231	.0286	.....	.0130	.....	.0180	.0164	.....	.....
1905-1906	.0402	.....	.0234	.0279	.....	.0185	.....	.0166	.0134	.....	.....
1906-1907	.0412	.....	.0216	.0288	.....	.0246	.....	.0147	.0116	.....	.....
1907-1908	.0435	.....	.0223	.0313	.....	.0218	.....	.0142	.0110	.....	.....
1908-1909	.0406	.....	.0208	.0375	.....	.0223	.....	.0148	.0120	.....	.....
1909-1910	.0377	.....	.0170	.0322	.....	.0217	.....	.0143	.0088	.....	.....
1910-1911	.0356	.....	.0152	.0362	.....	.0229	.....	.0168	.0086	.....	.....
1911-1912	.0345	.....	.0150	.0342	.....	.0229	.....	.....	.0098	.....	.....
1912-1913	.0336	.....	.0152	.0351	.....	.0227	.....	.....	.0083	.....	.....
1913-1914	.0320	.....	.0142	.0376	.....	.0233	.....	.....	.0077	.....	.....
1914-1915	.0314	.....	.0145	.0371	.....	.0262	.....	.....	.0043	.....	.....
1915-1916	.0274	.....	.0159	.0444	.....	.0265	.....	.....	.0028	.....	.....
1916-1917	.0307	.....	.0143	.0420	.....	.0247	.....	.....	.0032	.....	.....
1917-1918	.0285	.....	.0145	.0450	.....	.0320	.....	.....	.0037	.....	.....
1918-1919	.0233	.....	.0137	.0435	.....	.0303	.....	.....	.0025	.....	.....
1919-1920	.0198	.....	.0121	.0419	.....	.0309	.....	.....	.0033	.....	.....
1920-1921	.0147	.....	.0121	.0462	.....	.0321	.....	.....	.0042	.....	.....
1921-1922	.0166	.....	.0131	.0552	.....	.0363	.....	.....	.0028	.....	.....
1922-1923	.0165	.....	.0145	.0636	.....	.0322	.....	.....	.0019	.....	.....
1923-1924	.0183	.....	.0126	.0593	.....	.0294	.....	.....	.0019	.....	.....
1924-1925	.0248	.....	.0129	.0543	.....	.0303	.....	.....	.0012	.....	.....
1925-1926	.0270	.....	.0132	.0550	.....	.0245	.....	.....	.0014	.....	.....
1926-1927	.0270	.....	.0132	.0499	.....	.0235	.....	.....	.0034	.....	.....
1927-1928	.0294	.....	.0159	.0442	.....	.0242	.....	.....	.0037	.....	.....
1928-1929	.0362	.....	.0135	.0334	.....	.0206	.....	.....	.0033	.....	.....
1929-1930	.0393	.....	.0128	.0276	.....	.0194	.....	.....	.0050	.....	.....
1930-1931	.0384	.....	.0077	.0253	.....	.0210	.....	.....	.0059	.....	.....
1931-1932	.0312	.....	.0063	.0206	.....	.0170	.....	.....	.0048	.....	.....
1932-1933	.0313	.....	.0063	.0207	.....	.0171	.....	.....	.0048	.....	.....
1933-1934	.0313	.....	.0063	.0207	.....	.0171	.....	.....	.0048	.....	.....
1934-1935	.0313	.....	.0063	.0207	.....	.0171	.....	.....	.0048	.....	.....
1935-1936	.0313	.....	.0063	.0207	.....	.0171	.....	.....	.0048	.....	.....

RAILROAD STOCK PRICES

A195

JANUARY 1857 TO JANUARY 1936

12	13	14	15	16	17	18	19	20	21	22	January Dates
.0359			.0598			.0463			.1597	.0087	1857-1858
.0373			.0711			.0421			.1812	.0069	1858-1859
.0308			.0705			.0365			.1867	.0118	1859-1860
.0337			.0864			.0356			.1696	.0153	1860-1861
.0272			.1092			.0350			.1606	.0150	1861-1862
.0254			.0902			.0347			.1685	.0126	1862-1863
.0263			.0786	.0041		.0283	.0038		.1470	.0207	1863-1864
.0283			.0845	.0046			.0139		.1148	.0292	1864-1865
.0200			.0851	.0031			.0164		.0925	.0238	1865-1866
.0227			.0983	.0026			.0143		.0796	.0247	1866-1867
.0261			.0783	.0023			.0148		.0874	.0356	1867-1868
.0332			.0766	.0029			.0216		.0871	.0475	1868-1869
.0372			.0754	.0020			.0254		.0970	.0450	1869-1870
.0373			.0737	.0012			.0219				1870-1871
.0376			.0642	.0013			.0200				1871-1872
.0347			.0556				.0178				1872-1873
.0438			.0591				.0193				1873-1874
.0420			.0478				.0146				1874-1875
.0416			.0466				.0111				1875-1876
.0424			.0456				.0097				1876-1877
.0507			.0337				.0108				1877-1878
.0457		.0019	.0471				.0118				1878-1879
.0486		.0024	.0459				.0162				1879-1880
.0372		.0037	.0348		.0013		.0160	.0079			1880-1881
.0498		.0036	.0322		.0024		.0167	.0071			1881-1882
.0489		.0040	.0335		.0026		.0186	.0058			1882-1883
.0432		.0037	.0344		.0019		.0290	.0085			1883-1884
.0446		.0037	.0355		.0011		.0331	.0062			1884-1885
.0496		.0033	.0388		.0012		.0305	.0062			1885-1886
.0472		.0036	.0366		.0015		.0295	.0063			1886-1887
.0459			.0317		.0022		.0280	.0072			1887-1888
.0431			.0393		.0015		.0281	.0061			1888-1889
.0391			.0395		.0017		.0290	.0052			1889-1890
.0344			.0371		.0013		.0268	.0048			1890-1891
.0276			.0384		.0012		.0284	.0040			1891-1892
.0298			.0383		.0013		.0322	.0062			1892-1893
.0279			.0358		.0010		.0312	.0066			1893-1894
.0270			.0409		.0003		.0354	.0059			1894-1895
.0264			.0392		.0003		.0343	.0056			1895-1896
.0267			.0432				.0336	.0056			1896-1897
.0272			.0427				.0351	.0080			1897-1898
.0337			.0444				.0385	.0112			1898-1899
.0360			.0434				.0352	.0109			1899-1900
.0315			.0400				.0373	.0134			1900-1901
.0315			.0408				.0347	.0126			1901-1902
.0375			.0435				.0324	.0103			1902-1903
	.0158		.0498				.0306	.0106			1903-1904
	.0086		.0508				.0328	.0109			1904-1905
	.0100		.0466				.0343	.0109			1905-1906
	.0052		.0399				.0408	.0085			1906-1907
	.0060		.0378				.0421	.0074			1907-1908
	.0041		.0378				.0446	.0074			1908-1909
	.0051		.0357				.0524				1909-1910
	.0087		.0316				.0420				1910-1911
	.0061		.0312				.0400				1911-1912
	.0047		.0323				.0389				1912-1913
	.0042		.0276				.0359				1913-1914
	.0029		.0268				.0379				1914-1915
.0036			.0302				.0417				1915-1916
.0030			.0260				.0380				1916-1917
.0083			.0262				.0402				1917-1918
.0045			.0303				.0401				1918-1919
.0050			.0294				.0381				1919-1920
.0060			.0294				.0374				1920-1921
.0062			.0297				.0302				1921-1922
.0074			.0345				.0284				1922-1923
.0066			.0330				.0313				1923-1924
.0052			.0344				.0205				1924-1925
.0078			.0315				.0235				1925-1926
.0083			.0291				.0232				1926-1927
.0094			.0270				.0226				1927-1928
.0119			.0268				.0197				1928-1929
.0126			.0240				.0177				1929-1930
.0111			.0204				.0237				1930-1931
.0091			.0165				.0193				1931-1932
.0091			.0166				.0194				1932-1933
.0091			.0166				.0194				1933-1934
.0091			.0166				.0194				1934-1935
.0091			.0166				.0194				1935-1936

TABLE 15—RAILROAD COMMON STOCK WEIGHTS

[illegible]

RAILROAD STOCK PRICES

A197

JANUARY 1857 TO JANUARY 1936

34	35	36	37	38	39	40	41	42	43	44	January Dates
	.0348					.0914		.0307			1857-1858
	.0415					.1003		.0073			1858-1859
	.0422					.1049		.0067			1859-1860
	.0416					.0963		.0050			1860-1861
	.0383					.0863		.0064			1861-1862
	.0473					.0882		.0105			1862-1863
	.0506					.0907	.0222	.0258		.0089	1863-1864
	.0374					.0987	.0244	.0335		.0102	1864-1865
	.0360					.0878	.0307	.0334		.0163	1865-1866
	.0238					.0756	.0330	.0297		.0139	1866-1867
	.0190					.0695	.0334	.0265		.0125	1867-1868
.0516	.0146					.0725	.0284	.0246		.0099	1868-1869
.0506	.0163					.0800	.0286	.0228		.0098	1869-1870
.0508	.0185					.0780		.0277		.0091	1870-1871
.0557	.0220					.0785		.0310		.0078	1871-1872
.0492	.0225					.0827				.0074	1872-1873
.0459	.0215					.0745				.0071	1873-1874
.0449	.0190					.1117				.0062	1874-1875
.0438	.0163					.1250				.0064	1875-1876
.0422	.0141					.1195				.0067	1876-1877
.0510	.0109					.1321				.0060	1877-1878
.0535	.0119					.0946				.0041	1878-1879
.0493	.0117	.0008				.0867				.0029	1879-1880
.0328	.0140	.0040				.0833				.0045	1880-1881
.0287	.0120	.0031				.0881				.0046	1881-1882
.0287	.0106	.0034				.0912			.0089	.0056	1882-1883
.0286	.0099	.0027				.0918			.0103	.0058	1883-1884
.0321	.0086	.0020				.1009			.0122	.0070	1884-1885
.0377	.0053	.0010				.1057			.0143	.0079	1885-1886
.0313	.0072	.0016	.0032			.0920			.0143	.0080	1886-1887
.0315	.0075	.0011	.0034			.0941			.0148	.0079	1887-1888
.0327	.0065	.0005	.0024			.0961			.0149	.0102	1888-1889
.0347	.0076	.0025	.0026			.1059			.0190	.0094	1889-1890
.0334		.0151	.0094	.0019		.1026			.0166	.0081	1890-1891
.0338		.0149	.0071	.0027		.1073			.0178	.0083	1891-1892
.0353		.0143	.0111	.0025		.1005			.0163	.0072	1892-1893
.0372		.0115	.0100	.0025		.0978			.0189	.0073	1893-1894
.0454		.0086	.0094	.0021		.1136			.0214	.0090	1894-1895
.0481		.0098	.0094	.0018		.1188			.0190	.0090	1895-1896
.0463		.0084	.0078	.0017		.1181			.0175	.0089	1896-1897
.0453		.0068	.0090	.0013		.1170			.0101	.0088	1897-1898
.0443		.0080	.0110	.0006		.1207			.0077	.0093	1898-1899
		.0089	.0104		.0017	.1038				.0084	1899-1900
		.0104	.0108		.0020	.1149				.0085	1900-1901
		.0111	.0123		.0023	.1145				.0106	1901-1902
		.0108	.0112		.0030	.1205				.0095	1902-1903
		.0096	.0113		.0039	.1237				.0095	1903-1904
		.0089	.0087		.0033	.1465				.0083	1904-1905
		.0107	.0095		.0031	.1299				.0112	1905-1906
		.0101	.0087		.0030	.1045				.0086	1906-1907
		.0102	.0079			.1028				.0089	1907-1908
		.0081	.0060			.1108				.0100	1908-1909
		.0075	.0085			.0937				.0091	1909-1910
		.0075	.0109			.1111					1910-1911
		.0064	.0110			.1233					1911-1912
		.0057	.0096			.1180					1912-1913
		.0051	.0099			.1227					1913-1914
		.0041	.0088			.1238					1914-1915
		.0025	.0070			.1353					1915-1916
		.0046	.0088			.1294					1916-1917
		.0091				.1286					1917-1918
		.0097				.1364					1918-1919
		.0096				.1247					1919-1920
		.0105				.1255					1920-1921
		.0116				.1248					1921-1922
		.0110				.1066					1922-1923
		.0128				.1262					1923-1924
		.0136				.1230					1924-1925
		.0196				.1077					1925-1926
		.0274				.1035					1926-1927
		.0327				.1016					1927-1928
		.0342				.1050					1928-1929
		.0404				.1119					1929-1930
		.0287				.1944					1930-1931
		.0932				.1588					1931-1932
		.0936				.1609					1932-1933
		.0936				.1610					1933-1934
		.0936				.1610					1934-1935
		.0936				.1610					1935-1936

TABLE 15—RAILROAD COMMON STOCK WEIGHTS

January Dates	45	46	47	48	49	50	51 & 52	53	54	55	56
1857-1858			.0095	.0199				.0333			
1858-1859			.0112	.0108				.0261			
1859-1860			.0161	.0043				.0220			
1860-1861			.0151	.0008				.0177			
1861-1862			.0198		.0029			.0287			
1862-1863			.0217		.0048			.0246			
1863-1864			.0176		.0064			.0314			
1864-1865			.0441		.0050			.0282			
1865-1866			.0351		.0043			.0337			
1866-1867			.0395			.0057		.0387			
1867-1868			.0102			.0063		.0391	.0032		
1868-1869			.0407			.0068		.0431	.0025		
1869-1870			.0375			.0103		.0506	.0038		
1870-1871			.0404			.0175		.0439	.0097		
1871-1872			.0406			.0113		.0500	.0067		
1872-1873			.0443			.0127		.0423	.0083		
1873-1874			.0409			.0127		.0370	.0069		
1874-1875			.0473				.0115	.0328	.0046		
1875-1876			.0535				.0094	.0483	.0033		
1876-1877			.0540				.0095	.0504	.0030		
1877-1878			.0522				.0059	.0650	.0026		
1878-1879			.0483				.0128	.0629	.0023		
1879-1880			.0357				.0120	.0664	.0025	.0030	
1880-1881			.0338				.0141	.0513	.0041	.0195	.0018
1881-1882			.0278				.0154	.0830	.0040	.0148	.0013
1882-1883			.0298				.0192	.0653		.0153	.0010
1883-1884			.0290				.0269	.0705		.0197	.0013
1884-1885	.0007		.0410				.0251	.0767		.0102	.0012
1885-1886	.0006		.0423				.0251	.1006		.0087	.0010
1886-1887	.0010		.0324				.0251	.0928		.0116	.0014
1887-1888	.0013		.0294				.0275	.0830		.0105	.0019
1888-1889	.0010		.0363				.0248	.0813		.0089	.0024
1889-1890	.0011		.0372				.0218	.0719		.0108	.0016
1890-1891	.0011		.0329				.0246	.0630		.0120	.0012
1891-1892		.0026	.0342				.0223	.0582		.0107	.0010
1892-1893		.0051	.0289				.0261	.0584		.0086	.0015
1893-1894		.0036	.0337				.0259	.0582		.0059	.0015
1894-1895		.0029	.0275				.0236	.0555		.0020	.0010
1895-1896		.0035	.0254				.0235	.0533		.0015	.0008
1896-1897		.0035	.0261				.0275	.0543		.0016	.0011
1897-1898		.0028	.0206				.0299	.0520		.0099	.0009
1898-1899		.0081	.0160				.0355	.0673		.0156	.0009
1899-1900		.0115	.0127				.0360	.0688		.0235	.0012
1900-1901		.0106	.0120				.0328	.0710		.0248	
1901-1902		.0076	.0131				.0368				
1902-1903		.0084	.0117				.0378				
1903-1904		.0081	.0120				.0370				
1904-1905		.0065	.0122				.0341				
1905-1906		.0060	.0141				.0318				
1906-1907		.0050	.0156				.0256			.0750	
1907-1908		.0052	.0144				.0304			.0941	
1908-1909		.0058	.0146				.0287			.0949	
1909-1910		.0058	.0134				.0389			.0779	
1910-1911		.0071	.0170				.0354			.0689	
1911-1912		.0078	.0226				.0312			.0630	
1912-1913		.0079	.0220				.0264			.0615	
1913-1914		.0077	.0200				.0268			.0601	
1914-1915		.0070	.0204				.0266			.0621	
1915-1916		.0068	.0208				.0270			.0654	
1916-1917		.0152	.0211				.0256			.0633	
1917-1918			.0214				.0238			.0609	
1918-1919			.0204				.0153			.0619	
1919-1920			.0186				.0126			.0629	
1920-1921			.0156				.0130			.0594	
1921-1922			.0200				.0105			.0639	
1922-1923			.0223				.0068			.0595	
1923-1924			.0224				.0071			.0495	
1924-1925			.0223				.0052			.0363	
1925-1926			.0212				.0039			.0384	
1926-1927			.0194				.0028			.0353	
1927-1928			.0240				.0022			.0357	
1928-1929			.0164				.0041			.0346	
1929-1930			.0150				.0053			.0342	
1930-1931			.0181				.0176			.0372	
1931-1932			.0147				.0143			.0302	
1932-1933			.0148				.0144			.0303	
1933-1934			.0148				.0144			.0303	
1934-1935			.0148				.0144			.0303	
1935-1936			.0148				.0144			.0303	

RAILROAD STOCK PRICES

A199

JANUARY 1857 TO JANUARY 1936

57	58	59	60	61	62	63	64	65	66	67	January Dates
		.0207			.0179						1857-1858
		.0260			.0245						1858-1859
		.0270			.0272						1859-1860
					.0302						1860-1861
					.0265						1861-1862
					.0266						1862-1863
					.0709		.0058			.0060	1863-1864
					.0143		.0054			.0047	1864-1865
					.0149		.0056				1865-1866
					.0164		.0064				1866-1867
		.0203			.0138		.0123				1867-1868
		.0200			.0105		.0127				1868-1869
		.0213			.0098		.0160				1869-1870
		.0215			.0100		.0155				1870-1871
		.0202			.0089		.0190				1871-1872
		.0180			.0093		.0200				1872-1873
				.0340	.0117		.0176				1873-1874
				.0317	.0121		.0171				1874-1875
				.0338	.0117		.0168				1875-1876
				.0365	.0113		.0160				1876-1877
				.0471	.0138		.0204				1877-1878
				.0524	.0139		.0172				1878-1879
				.0465	.0127		.0158				1879-1880
				.0285	.0094	.0186	.0137				1880-1881
.0115				.0238	.0082	.0177	.0146				1881-1882
.0196				.0232	.0082	.0136	.0129				1882-1883
.0235				.0219	.0114	.0126	.0139				1883-1884
.0166				.0249	.0131	.0067	.0174				1884-1885
.0184				.0304	.0176	.0074	.0202				1885-1886
.0194				.0277	.0156	.0101	.0174				1886-1887
.0182				.0263	.0159	.0086	.0160				1887-1888
.0184				.0280	.0170	.0084	.0159	.0020			1888-1889
.0174				.0331	.0176	.0083	.0167	.0022			1889-1890
	.0114			.0354	.0168	.0087	.0146	.0019			1890-1891
	.0128			.0415		.0080	.0155	.0015			1891-1892
	.0172			.0465		.0084	.0140	.0020			1892-1893
	.0190			.0671		.0077	.0164	.0019			1893-1894
	.0227			.0637		.0080	.0198	.0019			1894-1895
	.0233			.0678		.0086	.0253	.0017			1895-1896
	.0249			.0750		.0072	.0255	.0016			1896-1897
	.0261			.0728		.0075	.0269	.0015			1897-1898
	.0270			.0813		.0078	.0248	.0016			1898-1899
	.0873			.0674		.0077	.0196	.0014			1899-1900
	.0907			.0681		.0076	.0039	.0011			1900-1901
	.0996			.0596		.0095	.0039	.0015	.0006		1901-1902
	.0914			.0455		.0079	.0027	.0017	.0008		1902-1903
	.0898			.0613		.0069	.0025	.0021	.0011		1903-1904
	.0890			.0634		.0053	.0028	.0017	.0011		1904-1905
	.0954			.0503		.0078	.0025	.0019	.0011		1905-1906
	.1076			.0396		.0074	.0016	.0023	.0009		1906-1907
	.0638			.0376		.0064	.0021	.0012	.0008		1907-1908
	.0786			.0407		.0062	.0008	.0013	.0004		1908-1909
	.0680			.0360		.0061	.0029	.0017	.0011		1909-1910
	.0579			.0329		.0055	.0017	.0024	.0010		1910-1911
	.0561			.0569		.0051	.0012	.0019	.0005		1911-1912
	.0572			.0524		.0046	.0007	.0018	.0003		1912-1913
	.0548			.0468		.0038	.0007	.0017			1913-1914
	.0713			.0301		.0037	.0005	.0013			1914-1915
	.0733			.0212		.0034		.0005	.0013		1915-1916
	.0681			.0249		.0037	.0005	.0013			1916-1917
	.0659			.0165		.0037	.0008	.0012			1917-1918
	.0654			.0140		.0034		.0005	.0006		1918-1919
	.0641			.0132		.0032		.0004	.0011		1919-1920
	.0595			.0126		.0030		.0005	.0012		1920-1921
	.0586			.0102		.0033		.0005	.0021		1921-1922
	.0566			.0071		.0038		.0002	.0024		1922-1923
	.0494			.0083		.0031		.0001	.0031		1923-1924
	.0394			.0076		.0030		.0002	.0065		1924-1925
	.0388			.0108		.0032		.0004	.0086		1925-1926
	.0364			.0130		.0030		.0003	.0103		1926-1927
	.0369			.0124		.0027		.0002	.0101		1927-1928
	.0348			.0144		.0025		.0002	.0065		1928-1929
	.0344			.0172		.0021			.0058		1929-1930
	.0373			.0235		.0087			.0051		1930-1931
	.0303			.0191		.0071			.0041		1931-1932
	.0304			.0192		.0071			.0041		1932-1933
	.0304			.0192		.0071			.0041		1933-1934
	.0304			.0192		.0071			.0041		1934-1935
	.0304			.0192		.0071			.0041		1935-1936

TABLE 15—RAILROAD COMMON STOCK WEIGHTS

January Dates	68	69	70	71	72	73	74	75	76	77	78
1857-1858											
1858-1859											
1859-1860											
1860-1861											
1861-1862											
1862-1863											
1863-1864											
1864-1865											
1865-1866	.0042										
1866-1867	.0081										
1867-1868	.0071										
1868-1869	.0062										
1869-1870	.0100										
1870-1871	.0167					.0324					
1871-1872	.0142					.0448					
1872-1873	.0185					.0763					
1873-1874	.0173					.0620					
1874-1875	.0128					.0366				.0060	
1875-1876	.0043					.0207				.0063	
1876-1877	.0012					.0158				.0052	
1877-1878		.0020				.0149				.0031	
1878-1879		.0056								.0061	
1879-1880		.0068					.0350			.0133	.0043
1880-1881			.0115				.0406				.0105
1881-1882			.0107				.0331				.0135
1882-1883			.0086				.0274				.0105
1883-1884			.0077				.0249				.0053
1884-1885			.0040				.0185		.0006		.0045
1885-1886			.0015				.0116		.0003		.0038
1886-1887			.0026				.0170		.0008		.0067
1887-1888			.0036				.0198		.0012		.0073
1888-1889			.0035				.0181		.0010		.0070
1889-1890			.0031				.0186		.0010		.0064
1890-1891				.0029			.0160		.0008		.0050
1891-1892				.0025			.0132		.0010		.0036
1892-1893				.0023			.0176		.0011		.0028
1893-1894				.0023			.0136		.0018		.0028
1894-1895				.0017			.0100		.0015		.0031
1895-1896				.0016			.0073		.0015		.0027
1896-1897				.0017				.0132	.0011		.0032
1897-1898				.0016				.0129	.0010		.0036
1898-1899				.0016				.0131			.0044
1899-1900				.0014				.0103			.0036
1900-1901				.0012				.0077			.0053
1901-1902				.0018				.0161			.0060
1902-1903				.0025				.0183			.0057
1903-1904				.0030				.0160			.0041
1904-1905				.0031				.0128			.0042
1905-1906				.0025				.0145			.0033
1906-1907				.0021				.0129			.0032
1907-1908				.0022				.0106			.0024
1908-1909				.0015				.0056			.0031
1909-1910				.0022				.0080			.0026
1910-1911				.0026				.0070			.0022
1911-1912				.0018				.0067			.0018
1912-1913				.0007				.0074			.0017
1913-1914				.0004				.0071			.0013
1914-1915				.0004				.0074			.0012
1915-1916				.0002				.0065			.0007
1916-1917					.0015			.0098			.0016
1917-1918					.0015			.0083			.0020
1918-1919					.0014			.0052			.0034
1919-1920					.0013			.0051			.0045
1920-1921					.0015			.0044			.0023
1921-1922					.0016			.0048			.0033
1922-1923					.0013			.0031			.0022
1923-1924					.0016			.0034			.0018
1924-1925					.0022			.0075			.0044
1925-1926					.0032			.0081			.0038
1926-1927					.0061			.0080			.0061
1927-1928					.0052			.0099			.0083
1928-1929					.0062			.0138			.0058
1929-1930					.0063			.0132			
1930-1931					.0100			.0226			
1931-1932					.0081			.0184			
1932-1933					.0082			.0185			
1933-1934					.0082			.0185			
1934-1935					.0082			.0185			
1935-1936					.0082			.0185			

RAILROAD STOCK PRICES

A201

JANUARY 1857 TO JANUARY 1936

79	80	81	82	83	84	85	86	87	88	89	January Dates
											1857-1858
											1858-1859
											1859-1860
											1860-1861
											1861-1862
											1862-1863
											1863-1864
											1864-1865
											1865-1866
											1866-1867
											1867-1868
											1868-1869
											1869-1870
											1870-1871
											1871-1872
											1872-1873
											1873-1874
											1874-1875
											1875-1876
											1876-1877
						.0015		.0027			1877-1878
						.0027		.0032			1878-1879
						.0020		.0018			1879-1880
						.0206		.0024		.0063	1880-1881
						.0382		.0102		.0114	1881-1882
.0225						.0317		.0152		.0141	1882-1883
.0265						.0452		.0151		.0211	1883-1884
.0254						.0395		.0125		.0113	1884-1885
.0241						.0387		.0084		.0126	1885-1886
.0307						.0480		.0081		.0080	1886-1887
.0387	.0079					.0517		.0121		.0108	1887-1888
.0380	.0079					.0577		.0114		.0151	1888-1889
.0312	.0069					.0589		.0067		.0162	1889-1890
.0275	.0055					.0339		.0053		.0158	1890-1891
.0270	.0048			.0013		.0252		.0037		.0304	1891-1892
.0258	.0061			.0016		.0263		.0052		.0339	1892-1893
.0208	.0049			.0016		.0315		.0065	.0012	.0295	1893-1894
.0193	.0047			.0015		.0250		.0049	.0008	.0277	1894-1895
.0091	.0036			.0012		.0103		.0057	.0007	.0208	1895-1896
.0102	.0038			.0009		.0040		.0058	.0007	.0255	1896-1897
.0102	.0042			.0015		.0127		.0053	.0007	.0202	1897-1898
.0091	.0040			.0005		.0103		.0063	.0006	.0229	1898-1899
.0128	.0038			.0004		.0105		.0056	.0006	.0243	1899-1900
.0135	.0047			.0009		.0134		.0045	.0010	.0215	1900-1901
.0124	.0040			.0011		.0118		.0033	.0011	.0249	1901-1902
.0317	.0061			.0012		.0240	.0024	.0049	.0017	.0248	1902-1903
.0316	.0066			.0014		.0315	.0023	.0057	.0017	.0249	1903-1904
.0304	.0055			.0018		.0313	.0037	.0057	.0016	.0269	1904-1905
.0294	.0033			.0015		.0282	.0023	.0045	.0010	.0264	1905-1906
.0259	.0038			.0012		.0277	.0028	.0063	.0013	.0260	1906-1907
.0189	.0040		.0014	.0009		.0225	.0024	.0057	.0009	.0216	1907-1908
.0168	.0036		.0011	.0007		.0257	.0021	.0059	.0010	.0202	1908-1909
.0107	.0024		.0006	.0004		.0228	.0021	.0049	.0008	.0181	1909-1910
.0131	.0035		.0008	.0005		.0361	.0028	.0061	.0008	.0167	1910-1911
.0116	.0035		.0010	.0003		.0397	.0024	.0059	.0010	.0183	1911-1912
.0086	.0024		.0053	.0002		.0374	.0021	.0045	.0010	.0188	1912-1913
.0071	.0017		.0061	.0002		.0387	.0017	.0038	.0010	.0193	1913-1914
.0070	.0017		.0042	.0003		.0413	.0016	.0035	.0012	.0203	1914-1915
.0050	.0015		.0037	.0002		.0420	.0017	.0030	.0009	.0219	1915-1916
.0023	.0006		.0019	.0001		.0509	.0018	.0016	.0007	.0214	1916-1917
.0010	.0011		.0031	.0001		.0510	.0019	.0009	.0007	.0203	1917-1918
.0061	.0013		.0030	.0016	.0017	.0528	.0017	.0013	.0011	.0214	1918-1919
.0055	.0005	.0020	.0020	.0009	.0023	.0554	.0015	.0010	.0010	.0238	1919-1920
.0057	.0005	.0025	.0016	.0008	.0031	.0570	.0015	.0010	.0008	.0232	1920-1921
.0063		.0035	.0016	.0013	.0026	.0562	.0014	.0018	.0006	.0236	1921-1922
.0049		.0039	.0016	.0010	.0028	.0572	.0018	.0005	.0014	.0221	1922-1923
.0044		.0023	.0013	.0007	.0023	.0685	.0022	.0020	.0011	.0253	1923-1924
.0037		.0022	.0015	.0008	.0030	.0634	.0017	.0040	.0014	.0260	1924-1925
.0025		.0020	.0014	.0008	.0035	.0642	.0016	.0027	.0016	.0289	1925-1926
.0064		.0038	.0018	.0012	.0048	.0619	.0024	.0057	.0018	.0285	1926-1927
.0061		.0042	.0015	.0019	.0067	.0601	.0027	.0065	.0021	.0305	1927-1928
.0060		.0030	.0020		.0070	.0683	.0023	.0049	.0018	.0271	1928-1929
.0060		.0029	.0035		.0062	.0673	.0026	.0045	.0018	.0257	1929-1930
.0070		.0026	.0029		.0054	.0610	.0035	.0052	.0023	.0219	1930-1931
.0124		.0090	.0079		.0045	.0362	.0045	.0121	.0026	.0175	1931-1932
.0101		.0073	.0064		.0037	.0295	.0037	.0098	.0021	.0142	1932-1933
.0101		.0070	.0065			.0297	.0037	.0099		.0143	1933-1934
.0101		.0070	.0065			.0297	.0037	.0099		.0143	1934-1935
.0101		.0070	.0065			.0297	.0037	.0099		.0143	1935-1936

TABLE 15—RAILROAD COMMON STOCK WEIGHTS

January Dates	90	91	92	93	94	95	96	97	98	99	100
1857-1858											
1858-1859											
1859-1860											
1860-1861											
1861-1862											
1862-1863											
1863-1864											
1864-1865											
1865-1866											
1866-1867											
1867-1868											
1868-1869											
1869-1870											
1870-1871											
1871-1872											
1872-1873											
1873-1874											
1874-1875											
1875-1876											
1876-1877			.0413								
1877-1878			.0459								
1878-1879			.0536								
1879-1880			.0434				.0005				
1880-1881	.0067		.0542				.0015		.0014		
1881-1882	.0040		.0617				.0011		.0020		
1882-1883	.0049		.0624				.0016		.0016		
1883-1884	.0033		.0508				.0008		.0012	.0327	
1884-1885	.0041		.0411	.0017			.0004		.0011	.0330	
1885-1886	.0026		.0324	.0024			.0004		.0013	.0294	
1886-1887	.0028		.0277	.0029			.0007		.0017	.0372	
1887-1888	.0045		.0283	.0036			.0007		.0017	.0336	
1888-1889	.0043		.0286	.0020			.0005		.0016	.0318	
1889-1890	.0048		.0333	.0057			.0004		.0017	.0291	
1890-1891	.0053		.0315		.0108	.0295	.0006		.0032	.0380	
1891-1892	.0054		.0234		.0048	.0243	.0012		.0021	.0409	
1892-1893	.0063		.0206		.0057	.0338	.0014		.0017	.0420	
1893-1894	.0062		.0175		.0043	.0288	.0013		.0013	.0406	
1894-1895	.0063		.0103		.0012	.0235	.0008		.0005	.0420	
1895-1896			.0057		.0012	.0204	.0007		.0003	.0329	
1896-1897			.0029			.0223	.0011		.0004	.0310	
1897-1898			.0043			.0153	.0010		.0002	.0312	
1898-1899			.0106			.0202	.0013		.0002	.0454	
1899-1900			.0264			.0457	.0012		.0028	.0342	.0003
1900-1901			.0264			.0436	.0012		.0017	.0358	.0004
1901-1902			.0444			.0457		.0127	.0013	.0301	.0003
1902-1903			.0438			.0470		.0158	.0013	.0294	.0005
1903-1904			.0394			.0460		.0150	.0015	.0403	.0008
1904-1905	.0158		.0531			.0395		.0103	.0013	.0406	.0005
1905-1906	.0165		.0671			.0410		.0129	.0012	.0421	.0006
1906-1907	.0165		.0712			.0323		.0111	.0012	.0415	.0007
1907-1908		.0145	.0829			.0445		.0085	.0009	.0550	.0005
1908-1909		.0105	.0745			.0459		.0042	.0008	.0695	.0003
1909-1910		.0116	.0873			.0727		.0070	.0015	.0583	.0005
1910-1911		.0150	.0843			.0721		.0075	.0016	.0650	.0004
1911-1912		.0145	.0798			.0677		.0069	.0021	.0775	.0003
1912-1913		.0196	.0767			.0631		.0071	.0018	.0978	.0002
1913-1914		.0179	.0699			.0591		.0067	.0016	.1277	.0002
1914-1915		.0181	.0782			.0566		.0067	.0016	.1225	.0001
1915-1916		.0177	.0676			.0591		.0049	.0015	.1071	.0001
1916-1917		.0170	.0668			.0611		.0059	.0013	.1007	.0001
1917-1918		.0180	.0732			.0599		.0085	.0019	.0946	
1918-1919		.0181	.0745			.0674		.0082	.0018	.1093	
1919-1920		.0182	.0783			.0830		.0092	.0015	.1143	
1920-1921		.0185	.0823			.1003		.0097		.1021	
1921-1922		.0175	.0811			.0980		.0086		.0926	
1922-1923		.0184	.0894			.0872		.0068		.1001	
1923-1924		.0206	.0822			.0828		.0090		.0999	
1924-1925		.0213	.0798			.0905		.0142		.1066	
1925-1926		.0225	.0745			.0873		.0209		.0869	
1926-1927		.0324	.0630			.0737		.0268		.0746	
1927-1928		.0270	.0635			.0713		.0282		.0766	
1928-1929		.0217	.0613			.0656		.0272		.0908	
1929-1930		.0180	.0613			.0620		.0248		.0921	
1930-1931		.0122	.0333			.0558		.0195		.0498	
1931-1932		.0099	.0271			.0453		.0158		.1618	
1932-1933		.0099	.0272			.0461		.0159		.1638	
1933-1934		.0099	.0272			.0461		.0159		.1638	
1934-1935		.0099	.0272			.0461		.0159		.1638	
1935-1936		.0099	.0272			.0461		.0159		.1638	

A203

101	102	103	104	105	106	107	108	109	110	111	January Dates
											1857-1858
											1858-1859
											1859-1860
											1860-1861
											1861-1862
											1862-1863
											1863-1864
											1864-1865
											1865-1866
											1866-1867
											1867-1868
											1868-1869
											1869-1870
											1870-1871
											1871-1872
											1872-1873
											1873-1874
											1874-1875
											1875-1876
											1876-1877
											1877-1878
											1878-1879
											1879-1880
	.0007		.0053								1880-1881
	.0007		.0043								1881-1882
	.0007		.0040	.0007	.0011						1882-1883
	.0007		.0029	.0004	.0014						1883-1884
	.0008		.0019	.0003	.0009						1884-1885
	.0006		.0026	.0004	.0007						1885-1886
	.0005		.0023	.0006	.0011		.0006				1886-1887
	.0008		.0029	.0006	.0009		.0011				1887-1888
	.0007		.0035	.0004	.0004		.0010				1888-1889
	.0009		.0024	.0004	.0003		.0010				1889-1890
	.0006			.0005	.0003		.0016				1890-1891
	.0006			.0005	.0003	.0005	.0012				1891-1892
	.0006			.0006	.0004	.0008	.0011				1892-1893
					.0003	.0006	.0006				1893-1894
					.0006	.0005	.0004				1894-1895
					.0007	.0004	.0004				1895-1896
					.0010	.0006	.0002				1896-1897
			.0012		.0010	.0005	.0082	.0009			1897-1898
			.0016		.0012	.0006	.0079	.0025			1898-1899
			.0019		.0015	.0006	.0074	.0023			1899-1900
.0013			.0016		.0021	.0006	.0093	.0016			1900-1901
.0014			.0037		.0022	.0011	.0147	.0021			1901-1902
.0022			.0065		.0026	.0013	.0146	.0026			1902-1903
.0037					.0023	.0013	.0170	.0028			1903-1904
.0035					.0016	.0007	.0155	.0020			1904-1905
.0041					.0011	.0008	.0159	.0032			1905-1906
.0050					.0012	.0006	.0136	.0023			1906-1907
.0042					.0008	.0005	.0137	.0018			1907-1908
.0045					.0005	.0003	.0134	.0009			1908-1909
.0053					.0008	.0006	.0131	.0009			1909-1910
.0057					.0006						

TABLE 16

FOUR INDEX NUMBERS OF THE JANUARY PRICES OF
AMERICAN RAILROAD COMMON STOCKS¹

- Column 1. Unweighted geometric average index number (one share each stock).
- Column 2. Arithmetic average index number weighted according to the number of shares of each company outstanding at the beginning of each year.
- Column 3. Index based on arithmetic average price of one share of each stock.
- Column 4. Unweighted chain arithmetic average of relative prices.

Date	1	2	3	4
Jan 1857	100.00	100.00	100.00	100.00
" 1858	68.06	73.94	75.00	73.28
" 1859	70.09	75.07	75.08	78.23
" 1860	59.53	71.21	73.24	70.67
" 1861	76.49	80.54	83.23	99.38
" 1862	75.83	77.95	81.39	100.37
" 1863	132.42	125.35	129.07	183.57
" 1864	177.49	159.57	164.30	253.57
" 1865	167.96	155.18	160.14	243.67
" 1866	155.97	142.32	148.72	228.35
" 1867	165.17	148.49	159.35	243.05
" 1868	180.52	162.58	176.04	270.02
" 1869	200.81	180.16	194.73	304.79
" 1870	194.31	179.41	193.61	298.13
" 1871	202.56	187.09	199.44	312.68
" 1872	212.27	199.29	206.95	332.20
" 1873	215.40	208.53	207.67	340.33
" 1874	189.57	190.20	186.34	301.93
" 1875	173.84	185.72	180.27	283.73
" 1876	147.96	180.44	169.57	253.92
" 1877	109.76	142.74	136.82	200.82
" 1878	99.38	131.20	127.00	193.11
" 1879	128.29	146.80	148.88	286.29
" 1880	247.25	213.29	219.49	654.94
" 1881	303.27	265.69	278.67	816.02
" 1882	292.75	250.33	269.73	801.12
" 1883	286.02	246.70	271.09	799.10
" 1884	231.23	220.26	245.93	668.81
" 1885	174.27	179.64	205.91	525.90
" 1886	243.89	219.79	254.95	761.03
" 1887	283.93	236.15	281.23	910.12
" 1888	247.77	223.00	262.30	816.21
" 1889	238.01	212.96	255.11	804.64
" 1890	254.69	221.16	274.92	884.91

¹These indexes have been so adjusted (by multiplication) that January 1857 is, in each case, 100. In constructing these indexes all adjustments were made for rights, stock dividends, etc. For further details concerning the construction of these indexes see Ch. V.

TABLE 16—(Concluded)

FOUR INDEX NUMBERS OF THE JANUARY PRICES OF
AMERICAN RAILROAD COMMON STOCKS

Date	1	2	3	4
Jan 1891	221.99	199.43	254.87	789.77
" 1892	272.84	229.12	288.10	993.12
" 1893	258.10	224.79	289.54	969.17
" 1894	170.09	175.82	227.32	676.03
" 1895	151.75	170.88	222.92	617.02
" 1896	147.58	172.57	225.64	618.02
" 1897	132.89	170.08	220.53	577.17
" 1898	153.41	196.61	251.44	700.16
" 1899	198.15	241.52	311.90	937.13
" 1900	199.62	246.47	323.80	960.51
" 1901	267.82	301.27	389.94	1,337.52
" 1902	364.69	367.30	485.54	1,866.38
" 1903	416.11	396.94	533.95	2,162.22
" 1904	305.92	319.75	428.12	1,616.59
" 1905	403.84	405.51	538.66	2,161.23
" 1906	467.11	470.50	629.23	2,534.54
" 1907	424.45	462.58	596.73	2,323.81
" 1908	271.52	347.36	435.46	1,530.03
" 1909	427.49	450.14	592.17	2,542.73
" 1910	438.86	483.46	647.84	2,710.19
" 1911	369.15	444.16	581.15	2,322.20
" 1912	335.59	439.21	570.13	2,146.84
" 1913	324.64	439.30	565.65	2,099.42
" 1914	262.61	392.93	493.29	1,739.00
" 1915	186.16	345.10	421.17	1,327.70
" 1916	209.67	389.40	479.07	1,585.99
" 1917	232.51	383.22	485.94	1,835.69
" 1918	150.85	293.92	354.79	1,233.10
" 1919	160.09	310.27	375.64	1,329.84
" 1920	159.15	285.53	353.04	1,363.95
" 1921	154.88	281.67	354.07	1,381.66
" 1922	132.27	275.02	348.64	1,227.16
" 1923	160.05	318.38	406.63	1,527.92
" 1924	157.25	304.05	393.77	1,548.46
" 1925	245.88	380.73	544.49	2,533.96
" 1926	308.91	427.24	666.61	3,291.55
" 1927	326.54	463.52	715.02	3,523.71
" 1928	395.45	540.95	848.00	4,349.81
" 1929	459.53	615.13	959.42	5,162.39
" 1930	398.10	585.20	886.98	4,575.94
" 1931	228.01	427.38	603.35	2,784.01
" 1932	65.55	150.85	197.36	912.33
" 1933	45.36	118.47	151.04	666.07
" 1934	86.78	196.42	254.63	1,419.91
" 1935	54.45	152.64	190.89	906.56
" 1936	65.78	195.00	240.73	1,150.27

TABLE 17

AN ARITHMETIC AVERAGE INDEX NUMBER OF THE PRICES OF AMERICAN
RAILROAD COMMON STOCKS, WEIGHTED ACCORDING TO THE
NUMBER OF SHARES OF EACH COMPANY OUTSTANDING
AT THE BEGINNING OF EACH YEAR

MONTHLY, JANUARY 1857-JANUARY 1936

- Col. 1. Logarithms of Index (see Table 10—Column 6).
- Col. 2. Cyclical Curve (logarithms).
- Col. 3. Trend Curve (logarithms).
- Col. 4. Deviations of Cyclical Curve (logarithms) from Trend Curve (logarithms).

For details of the nature of the graduations given in columns 2 and 3 of this table see Appendix D.

TABLE 17

AMERICAN RAILROAD STOCK PRICES

Date	1	2	3	4	Date	1	2	3	4
1857					1862				
J	1.327	1.3225	1.2781	+ .0444	J	1.219	1.2126	1.2904	- .0778
F	1.319	1.3129	1.2746	+ .0383	F	1.234	1.2223	1.2982	- .0759
M	1.318	1.3008	1.2711	+ .0297	M	1.247	1.2335	1.3061	- .0726
A	1.310	1.2870	1.2678	+ .0192	A	1.243	1.2462	1.3138	- .0676
M	1.303	1.2722	1.2642	+ .0080	M	1.263	1.2604	1.3221	- .0617
J	1.276	1.2571	1.2609	- .0038	J	1.284	1.2760	1.3300	- .0540
J	1.270	1.2427	1.2575	- .0148	J	1.274	1.2926	1.3383	- .0457
A	1.248	1.2294	1.2542	- .0248	A	1.289	1.3102	1.3466	- .0364
S	1.180	1.2176	1.2510	- .0334	S	1.319	1.3285	1.3548	- .0263
O	1.108	1.2079	1.2478	- .0399	O	1.360	1.3471	1.3628	- .0157
N	1.166	1.2007	1.2445	- .0438	N	1.363	1.3657	1.3712	- .0055
D	1.184	1.1961	1.2413	- .0452	D	1.372	1.3840	1.3794	+ .0046
1858					1863				
J	1.196	1.1942	1.2382	- .0440	J	1.425	1.4017	1.3873	+ .0144
F	1.235	1.1952	1.2349	- .0397	F	1.440	1.4182	1.3951	+ .0231
M	1.242	1.1983	1.2317	- .0334	M	1.432	1.4335	1.4031	+ .0304
A	1.219	1.2028	1.2286	- .0258	A	1.437	1.4476	1.4107	+ .0369
M	1.226	1.2079	1.2257	- .0178	M	1.477	1.4603	1.4180	+ .0423
J	1.207	1.2123	1.2223	- .0100	J	1.463	1.4721	1.4253	+ .0468
J	1.209	1.2152	1.2192	- .0040	J	1.473	1.4831	1.4322	+ .0509
A	1.204	1.2160	1.2161	- .0001	A	1.502	1.4937	1.4390	+ .0547
S	1.198	1.2147	1.2133	+ .0014	S	1.503	1.5040	1.4558	+ .0582
O	1.211	1.2115	1.2101	+ .0014	O	1.514	1.5144	1.4520	+ .0624
N	1.208	1.2070	1.2071	- .0001	N	1.516	1.5247	1.4584	+ .0663
D	1.201	1.2019	1.2044	- .0025	D	1.512	1.5350	1.4642	+ .0708
1859					1864				
J	1.202	1.1969	1.2016	- .0047	J	1.530	1.5448	1.4697	+ .0751
F	1.197	1.1924	1.1989	- .0065	F	1.550	1.5538	1.4751	+ .0787
M	1.195	1.1885	1.1962	- .0077	M	1.580	1.5614	1.4802	+ .0812
A	1.184	1.1851	1.1940	- .0089	A	1.587	1.5672	1.4846	+ .0826
M	1.170	1.1822	1.1919	- .0097	M	1.568	1.5706	1.4892	+ .0814
J	1.173	1.1797	1.1897	- .0100	J	1.576	1.5712	1.4931	+ .0781
J	1.176	1.1778	1.1880	- .0102	J	1.572	1.5686	1.4969	+ .0717
A	1.179	1.1768	1.1865	- .0097	A	1.575	1.5628	1.5004	+ .0624
S	1.196	1.1772	1.1854	- .0082	S	1.549	1.5544	1.5037	+ .0507
O	1.188	1.1792	1.1844	- .0052	O	1.520	1.5438	1.5064	+ .0374
N	1.192	1.1832	1.1838	- .0006	N	1.543	1.5320	1.5092	+ .0228
D	1.188	1.1890	1.1835	+ .0055	D	1.539	1.5198	1.5113	+ .0085
1860					1865				
J	1.179	1.1964	1.1835	+ .0129	J	1.518	1.5084	1.5132	- .0048
F	1.182	1.2050	1.1839	+ .0211	F	1.507	1.4983	1.5151	- .0168
M	1.200	1.2140	1.1846	+ .0294	M	1.465	1.4900	1.5164	- .0264
A	1.222	1.2230	1.1857	+ .0373	A	1.459	1.4837	1.5173	- .0336
M	1.230	1.2314	1.1873	+ .0441	M	1.468	1.4793	1.5180	- .0387
J	1.236	1.2386	1.1891	+ .0495	J	1.460	1.4765	1.5185	- .0420
J	1.249	1.2442	1.1914	+ .0528	J	1.478	1.4751	1.5188	- .0437
A	1.274	1.2479	1.1941	+ .0538	A	1.473	1.4747	1.5189	- .0442
S	1.285	1.2492	1.1972	+ .0520	S	1.491	1.4753	1.5190	- .0437
O	1.270	1.2480	1.2006	+ .0474	O	1.503	1.4767	1.5188	- .0421
N	1.219	1.2444	1.2044	+ .0400	N	1.507	1.4788	1.5185	- .0397
D	1.190	1.2384	1.2087	+ .0297	D	1.500	1.4815	1.5182	- .0367
1861					1866				
J	1.233	1.2306	1.2132	+ .0174	J	1.480	1.4848	1.5176	- .0328
F	1.231	1.2217	1.2181	+ .0036	F	1.469	1.4883	1.5172	- .0289
M	1.241	1.2125	1.2232	- .0107	M	1.470	1.4918	1.5167	- .0249
A	1.207	1.2040	1.2288	- .0248	A	1.478	1.4950	1.5161	- .0211
M	1.172	1.1968	1.2348	- .0380	M	1.486	1.4979	1.5155	- .0176
J	1.176	1.1916	1.2409	- .0493	J	1.492	1.5003	1.5150	- .0147
J	1.194	1.1886	1.2474	- .0588	J	1.500	1.5024	1.5147	- .0123
A	1.185	1.1879	1.2541	- .0662	A	1.516	1.5041	1.5144	- .0103
S	1.184	1.1893	1.2609	- .0716	S	1.518	1.5055	1.5143	- .0088
O	1.200	1.1927	1.2679	- .0752	O	1.531	1.5064	1.5143	- .0079
N	1.206	1.1977	1.2753	- .0776	N	1.524	1.5069	1.5145	- .0076
D	1.193	1.2044	1.2827	- .0783	D	1.516	1.5068	1.5148	- .0080

TABLE 17—Continued

AMERICAN RAILROAD STOCK PRICES

Date	1	2	3	4	Date	1	2	3	4
1867					1872				
J	1.498	1.5061	1.5152	-.0091	J	1.626	1.6304	1.6273	+.0031
F	1.494	1.5049	1.5158	-.0109	F	1.629	1.6323	1.6276	+.0047
M	1.492	1.5034	1.5167	-.0133	M	1.642	1.6341	1.6278	+.0063
A	1.482	1.5021	1.5176	-.0155	A	1.655	1.6359	1.6279	+.0080
M	1.487	1.5014	1.5187	-.0173	M	1.654	1.6379	1.6279	+.0100
J	1.502	1.5018	1.5200	-.0182	J	1.649	1.6400	1.6279	+.0121
J	1.517	1.5035	1.5216	-.0181	J	1.645	1.6421	1.6279	+.0142
A	1.519	1.5068	1.5233	-.0165	A	1.639	1.6442	1.6280	+.0162
S	1.518	1.5114	1.5252	-.0138	S	1.634	1.6460	1.6280	+.0180
O	1.517	1.5171	1.5273	-.0102	O	1.633	1.6473	1.6279	+.0194
N	1.516	1.5234	1.5295	-.0061	N	1.630	1.6478	1.6278	+.0200
D	1.522	1.5298	1.5318	-.0020	D	1.642	1.6472	1.6277	+.0195
1868					1873				
J	1.538	1.5358	1.5341	+.0017	J	1.646	1.6457	1.6275	+.0182
F	1.548	1.5412	1.5367	+.0045	F	1.651	1.6431	1.6273	+.0158
M	1.546	1.5457	1.5393	+.0064	M	1.648	1.6395	1.6270	+.0125
A	1.543	1.5495	1.5418	+.0077	A	1.640	1.6352	1.6266	+.0086
M	1.558	1.5527	1.5448	+.0079	M	1.641	1.6302	1.6261	+.0041
J	1.565	1.5556	1.5475	+.0081	J	1.637	1.6248	1.6255	-.0007
J	1.565	1.5585	1.5504	+.0081	J	1.636	1.6192	1.6247	-.0055
A	1.560	1.5617	1.5532	+.0085	A	1.633	1.6134	1.6238	-.0104
S	1.564	1.5654	1.5562	+.0092	S	1.599	1.6077	1.6229	-.0152
O	1.571	1.5695	1.5591	+.0104	O	1.561	1.6022	1.6216	-.0194
N	1.558	1.5739	1.5621	+.0118	N	1.545	1.5971	1.6203	-.0200
D	1.567	1.5784	1.5650	+.0134	D	1.583	1.5929	1.6188	-.0259
1869					1874				
J	1.582	1.5828	1.5676	+.0152	J	1.606	1.5896	1.6171	-.0275
F	1.586	1.5868	1.5704	+.0164	F	1.618	1.5875	1.6151	-.0276
M	1.582	1.5901	1.5731	+.0170	M	1.610	1.5868	1.6131	-.0263
A	1.590	1.5928	1.5757	+.0171	A	1.598	1.5871	1.6109	-.0238
M	1.608	1.5946	1.5784	+.0162	M	1.587	1.5883	1.6085	-.0202
J	1.612	1.5957	1.5808	+.0149	J	1.582	1.5901	1.6059	-.0158
J	1.611	1.5962	1.5834	+.0128	J	1.583	1.5919	1.6032	-.0113
A	1.617	1.5962	1.5858	+.0104	A	1.586	1.5934	1.6003	-.0069
S	1.588	1.5959	1.5884	+.0075	S	1.592	1.5943	1.5970	-.0027
O	1.585	1.5953	1.5906	+.0047	O	1.591	1.5945	1.5937	+.0008
N	1.582	1.5948	1.5929	+.0019	N	1.592	1.5939	1.5902	+.0037
D	1.574	1.5943	1.5952	-.0009	D	1.592	1.5928	1.5865	+.0063
1870					1875				
J	1.581	1.5940	1.5977	-.0037	J	1.596	1.5913	1.5828	+.0085
F	1.594	1.5939	1.5997	-.0058	F	1.594	1.5895	1.5788	+.0107
M	1.592	1.5942	1.6018	-.0076	M	1.598	1.5877	1.5747	+.0130
A	1.598	1.5949	1.6040	-.0091	A	1.603	1.5860	1.5706	+.0154
M	1.615	1.5960	1.6061	-.0101	M	1.584	1.5846	1.5663	+.0183
J	1.618	1.5976	1.6081	-.0105	J	1.575	1.5833	1.5619	+.0214
J	1.605	1.5994	1.6099	-.0105	J	1.576	1.5823	1.5574	+.0249
A	1.597	1.6015	1.6117	-.0102	A	1.577	1.5815	1.5528	+.0287
S	1.601	1.6036	1.6134	-.0098	S	1.573	1.5809	1.5482	+.0327
O	1.603	1.6057	1.6150	-.0093	O	1.567	1.5803	1.5385	+.0368
N	1.603	1.6075	1.6166	-.0091	N	1.573	1.5796	1.5388	+.0408
D	1.598	1.6095	1.6180	-.0088	D	1.573	1.5787	1.5342	+.0445
1871					1876				
J	1.599	1.6105	1.6192	-.0087	J	1.583	1.5775	1.5296	+.0479
F	1.603	1.6117	1.6204	-.0087	F	1.590	1.5757	1.5250	+.0507
M	1.612	1.6127	1.6215	-.0088	M	1.591	1.5729	1.5204	+.0525
A	1.624	1.6138	1.6225	-.0087	A	1.574	1.5688	1.5158	+.0530
M	1.633	1.6151	1.6233	-.0082	M	1.555	1.5630	1.5115	+.0515
J	1.630	1.6165	1.6241	-.0076	J	1.551	1.5550	1.5074	+.0476
J	1.622	1.6183	1.6248	-.0065	J	1.547	1.5446	1.5032	+.0414
A	1.625	1.6202	1.6254	-.0052	A	1.527	1.5318	1.4992	+.0326
S	1.627	1.6223	1.6260	-.0037	S	1.501	1.5171	1.4953	+.0218
O	1.605	1.6244	1.6265	-.0021	O	1.497	1.5009	1.4918	+.0091
N	1.608	1.6265	1.6268	-.0003	N	1.487	1.4842	1.4885	-.0043
D	1.617	1.6285	1.6271	+.0014	D	1.485	1.4678	1.4853	-.0175

RAILROAD STOCK PRICES

A209

TABLE 17—Continued

AMERICAN RAILROAD STOCK PRICES

Date	1	2	3	4	Date	1	2	3	4
1877					1882				
I	1.481	1.4528	1.4823	-.0295	J	1.725	1.7262	1.7294	-.0032
F	1.453	1.4397	1.4797	-.0400	F	1.715	1.7228	1.7294	-.0066
M	1.432	1.4290	1.4774	-.0484	M	1.713	1.7206	1.7290	-.0084
A	1.399	1.4209	1.4754	-.0545	A	1.713	1.7196	1.7284	-.0088
M	1.398	1.4155	1.4737	-.0582	M	1.707	1.7194	1.7272	-.0078
J	1.373	1.4125	1.4723	-.0598	J	1.705	1.7200	1.7259	-.0059
J	1.387	1.4120	1.4714	-.0594	J	1.730	1.7211	1.7241	-.0030
A	1.414	1.4137	1.4709	-.0572	A	1.743	1.7224	1.7222	+ .0002
S	1.442	1.4174	1.4707	-.0533	S	1.747	1.7238	1.7199	+ .0039
O	1.455	1.4227	1.4709	-.0482	O	1.736	1.7249	1.7175	+ .0074
N	1.447	1.4292	1.4716	-.0424	N	1.718	1.7254	1.7148	+ .0106
D	1.445	1.4364	1.4726	-.0362	D	1.720	1.7251	1.7119	+ .0132
1878					1883				
I	1.445	1.4435	1.4739	-.0304	J	1.719	1.7241	1.7087	+ .0154
F	1.436	1.4500	1.4757	-.0257	F	1.708	1.7222	1.7056	+ .0166
M	1.443	1.4556	1.4780	-.0224	M	1.714	1.7197	1.7022	+ .0175
A	1.457	1.4599	1.4806	-.0207	A	1.724	1.7168	1.6990	+ .0178
M	1.457	1.4632	1.4836	-.0204	M	1.715	1.7137	1.6955	+ .0182
J	1.468	1.4657	1.4869	-.0212	J	1.719	1.7105	1.6922	+ .0183
J	1.476	1.4677	1.4907	-.0230	J	1.711	1.7071	1.6888	+ .0183
A	1.471	1.4698	1.4949	-.0251	A	1.691	1.7034	1.6854	+ .0180
S	1.480	1.4722	1.4997	-.0275	S	1.697	1.6993	1.6820	+ .0173
O	1.476	1.4751	1.5044	-.0293	O	1.685	1.6944	1.6789	+ .0155
N	1.474	1.4788	1.5099	-.0311	N	1.691	1.6887	1.6757	+ .0130
D	1.473	1.4835	1.5154	-.0319	D	1.682	1.6820	1.6727	+ .0093
1879					1884				
I	1.493	1.4895	1.5215	-.0320	J	1.670	1.6744	1.6696	+ .0048
F	1.510	1.4970	1.5277	-.0307	F	1.681	1.6661	1.6670	-.0009
M	1.501	1.5063	1.5343	-.0280	M	1.680	1.6573	1.6644	-.0071
A	1.514	1.5176	1.5410	-.0234	A	1.663	1.6482	1.6619	-.0137
M	1.536	1.5307	1.5481	-.0174	M	1.626	1.6391	1.6594	-.0203
J	1.542	1.5454	1.5554	-.0100	J	1.593	1.6299	1.6574	-.0275
J	1.550	1.5611	1.5628	-.0017	J	1.605	1.6209	1.6555	-.0346
A	1.556	1.5769	1.5704	+ .0065	A	1.631	1.6123	1.6537	-.0414
S	1.571	1.5921	1.5781	+ .0140	S	1.615	1.6043	1.6521	-.0478
O	1.615	1.6059	1.5863	+ .0196	O	1.600	1.5972	1.6508	-.0536
N	1.636	1.6179	1.5942	+ .0237	N	1.590	1.5914	1.6497	-.0583
D	1.638	1.6279	1.6021	+ .0258	D	1.591	1.5873	1.6485	-.0612
1880					1885				
J	1.656	1.6360	1.6100	+ .0260	J	1.581	1.5851	1.6479	-.0628
F	1.665	1.6425	1.6178	+ .0247	F	1.593	1.5851	1.6474	-.0623
M	1.672	1.6478	1.6257	+ .0221	M	1.594	1.5872	1.6470	-.0598
A	1.666	1.6525	1.6336	+ .0189	A	1.594	1.5913	1.6467	-.0554
M	1.629	1.6571	1.6416	+ .0155	M	1.587	1.5970	1.6466	-.0496
J	1.630	1.6621	1.6493	+ .0128	J	1.584	1.6040	1.6467	-.0427
J	1.649	1.6679	1.6568	+ .0111	J	1.602	1.6119	1.6469	-.0350
A	1.668	1.6750	1.6640	+ .0110	A	1.624	1.6202	1.6473	-.0271
S	1.667	1.6835	1.6709	+ .0126	S	1.619	1.6286	1.6478	-.0192
O	1.683	1.6934	1.6774	+ .0160	O	1.642	1.6369	1.6484	-.0115
N	1.709	1.7045	1.6838	+ .0207	N	1.668	1.6449	1.6491	-.0042
D	1.730	1.7164	1.6897	+ .0267	D	1.667	1.6523	1.6499	+ .0024
1881					1886				
J	1.751	1.7284	1.6955	+ .0329	J	1.669	1.6589	1.6507	+ .0082
F	1.746	1.7395	1.7006	+ .0389	F	1.676	1.6647	1.6518	+ .0129
M	1.752	1.7490	1.7054	+ .0436	M	1.668	1.6697	1.6528	+ .0169
A	1.750	1.7560	1.7097	+ .0463	A	1.662	1.6739	1.6539	+ .0200
M	1.767	1.7601	1.7139	+ .0462	M	1.654	1.6775	1.6550	+ .0225
J	1.771	1.7611	1.7173	+ .0438	J	1.673	1.6809	1.6563	+ .0246
J	1.754	1.7592	1.7203	+ .0389	J	1.680	1.6843	1.6576	+ .0267
A	1.746	1.7550	1.7230	+ .0320	A	1.684	1.6880	1.6589	+ .0251
S	1.749	1.7493	1.7252	-.0241	S	1.694	1.6920	1.6601	+ .0319
O	1.742	1.7428	1.7269	+ .0159	O	1.706	1.6963	1.6615	+ .0348
N	1.745	1.7365	1.7281	+ .0084	N	1.715	1.7006	1.6628	+ .0378
D	1.733	1.7308	1.7288	+ .0020	D	1.705	1.7047	1.6642	+ .0405

TABLE 17—Continued

AMERICAN RAILROAD STOCK PRICES

Date	1	2	3	4	Date	1	2	3	4
1887					1892				
J	1.700	1.7080	1.6657	+.0423	J	1.687	1.6813	1.6540	+.0273
F	1.696	1.7102	1.6670	+.0432	F	1.686	1.6848	1.6528	+.0320
M	1.706	1.7111	1.6684	+.0427	M	1.691	1.6875	1.6517	+.0358
A	1.718	1.7103	1.6696	+.0407	A	1.689	1.6894	1.6504	+.0390
M	1.725	1.7081	1.6708	+.0373	M	1.687	1.6906	1.6486	+.0420
J	1.714	1.7045	1.6720	+.0325	J	1.684	1.6912	1.6472	+.0440
J	1.702	1.6999	1.6730	+.0269	J	1.684	1.6911	1.6454	+.0457
A	1.691	1.6945	1.6739	+.0206	A	1.687	1.6900	1.6436	+.0464
S	1.685	1.6887	1.6746	+.0141	S	1.673	1.6876	1.6419	+.0457
O	1.668	1.6828	1.6754	+.0074	O	1.681	1.6838	1.6399	+.0449
N	1.674	1.6772	1.6759	+.0013	N	1.676	1.6783	1.6379	+.0404
D	1.673	1.6722	1.6762	-.0040	D	1.671	1.6713	1.6359	+.0354
1888					1893				
J	1.675	1.6679	1.6763	-.0084	J	1.679	1.6628	1.6339	+.0289
F	1.671	1.6645	1.6764	-.0119	F	1.669	1.6530	1.6316	+.0214
M	1.655	1.6621	1.6763	-.0142	M	1.654	1.6423	1.6295	+.0128
A	1.656	1.6605	1.6761	-.0156	A	1.657	1.6313	1.6274	+.0039
M	1.662	1.6595	1.6758	-.0163	M	1.625	1.6203	1.6249	-.0046
J	1.644	1.6590	1.6753	-.0163	J	1.604	1.6097	1.6226	-.0129
J	1.657	1.6586	1.6747	-.0161	J	1.563	1.6000	1.6203	-.0203
A	1.663	1.6583	1.6742	-.0159	A	1.554	1.5915	1.6179	-.0264
S	1.675	1.6578	1.6734	-.0156	S	1.578	1.5847	1.6151	-.0304
O	1.670	1.6573	1.6727	-.0154	O	1.585	1.5796	1.6128	-.0332
N	1.657	1.6567	1.6719	-.0152	N	1.594	1.5765	1.6103	-.0338
D	1.649	1.6561	1.6711	-.0150	D	1.581	1.5751	1.6077	-.0326
1889					1894				
J	1.655	1.6555	1.6702	-.0147	J	1.572	1.5752	1.6051	-.0299
F	1.659	1.6550	1.6695	-.0145	F	1.577	1.5761	1.6026	-.0265
M	1.647	1.6546	1.6687	-.0141	M	1.590	1.5773	1.6001	-.0228
A	1.644	1.6544	1.6678	-.0134	A	1.594	1.5780	1.5976	-.0196
M	1.655	1.6545	1.6670	-.0125	M	1.576	1.5778	1.5949	-.0171
J	1.660	1.6551	1.6664	-.0113	J	1.568	1.5764	1.5923	-.0159
J	1.649	1.6565	1.6658	-.0093	J	1.560	1.5740	1.5898	-.0158
A	1.659	1.6586	1.6652	-.0066	A	1.576	1.5712	1.5873	-.0161
S	1.674	1.6616	1.6646	-.0030	S	1.586	1.5684	1.5849	-.0165
O	1.670	1.6653	1.6642	+.0011	O	1.572	1.5663	1.5824	-.0161
N	1.669	1.6692	1.6638	+.0054	N	1.571	1.5654	1.5801	-.0147
D	1.667	1.6730	1.6636	+.0094	D	1.565	1.5660	1.5779	-.0119
1890					1895				
J	1.671	1.6761	1.6632	+.0129	J	1.559	1.5681	1.5756	-.0075
F	1.667	1.6781	1.6630	+.0151	F	1.553	1.5714	1.5736	-.0022
M	1.664	1.6787	1.6629	+.0158	M	1.550	1.5757	1.5716	+.0041
A	1.673	1.6778	1.6627	+.0151	A	1.567	1.5805	1.5697	+.0108
M	1.690	1.6752	1.6626	+.0126	M	1.590	1.5854	1.5679	+.0175
J	1.687	1.6712	1.6625	+.0087	J	1.600	1.5900	1.5663	+.0237
J	1.683	1.6659	1.6625	+.0034	J	1.607	1.5940	1.5649	+.0291
A	1.672	1.6597	1.6624	-.0027	A	1.613	1.5968	1.5638	+.0330
S	1.663	1.6528	1.6624	-.0096	S	1.617	1.5983	1.5627	+.0356
O	1.643	1.6456	1.6623	-.0167	O	1.611	1.5981	1.5618	+.0363
N	1.614	1.6387	1.6622	-.0235	N	1.597	1.5961	1.5614	+.0347
D	1.607	1.6325	1.6620	-.0295	D	1.570	1.5923	1.5612	+.0311
1891					1896				
J	1.627	1.6275	1.6618	-.0343	J	1.564	1.5872	1.5611	+.0261
F	1.631	1.6243	1.6616	-.0373	F	1.581	1.5810	1.5613	+.0197
M	1.621	1.6233	1.6613	-.0380	M	1.572	1.5744	1.5618	+.0126
A	1.637	1.6245	1.6609	-.0364	A	1.576	1.5679	1.5626	+.0053
M	1.636	1.6281	1.6604	-.0323	M	1.574	1.5618	1.5634	+.0016
J	1.626	1.6336	1.6600	-.0264	J	1.568	1.5564	1.5646	-.0082
J	1.621	1.6406	1.6595	-.0189	J	1.543	1.5520	1.5659	-.0139
A	1.639	1.6485	1.6587	-.0102	A	1.519	1.5484	1.5674	-.0190
S	1.676	1.6566	1.6579	-.0013	S	1.538	1.5438	1.5608	-.0232
O	1.676	1.6642	1.6571	+.0071	O	1.547	1.5442	1.5708	-.0266
N	1.667	1.6711	1.6562	+.0149	N	1.570	1.5438	1.5728	-.0290
D	1.682	1.6768	1.6552	+.0216	D	1.558	1.5449	1.5749	-.0300

RAILROAD STOCK PRICES

A211

TABLE 17—Continued

AMERICAN RAILROAD STOCK PRICES

Date	1	2	3	4	Date	1	2	3	4
1897					1902				
J	1.557	1.5473	1.5771	-.0298	J	1.892	1.8941	1.8536	+.0405
F	1.552	1.5512	1.5795	-.0283	F	1.895	1.8987	1.8560	+.0427
M	1.554	1.5563	1.5819	-.0256	M	1.896	1.9041	1.8583	+.0458
A	1.540	1.5624	1.5844	-.0220	A	1.912	1.9101	1.8604	+.0497
M	1.542	1.5690	1.5870	-.0180	M	1.914	1.9163	1.8622	+.0541
J	1.562	1.5759	1.5898	-.0139	J	1.915	1.9221	1.8643	+.0578
J	1.578	1.5826	1.5926	-.0100	J	1.931	1.9271	1.8661	+.0610
A	1.606	1.5889	1.5956	-.0067	A	1.944	1.9304	1.8678	+.0626
S	1.625	1.5946	1.5985	-.0039	S	1.945	1.9316	1.8697	+.0619
O	1.614	1.5994	1.6017	-.0023	O	1.930	1.9308	1.8714	+.0594
N	1.599	1.6035	1.6050	-.0015	N	1.913	1.9272	1.8731	+.0541
D	1.610	1.6067	1.6084	-.0017	D	1.905	1.9210	1.8749	+.0461
1898					1903				
J	1.620	1.6091	1.6117	-.0026	J	1.925	1.9125	1.8768	+.0357
F	1.618	1.6111	1.6153	-.0042	F	1.918	1.9022	1.8785	+.0237
M	1.598	1.6130	1.6150	-.0060	M	1.898	1.8907	1.8804	+.0103
A	1.589	1.6153	1.6229	-.0076	A	1.878	1.8785	1.8824	-.0039
M	1.614	1.6186	1.6270	-.0084	M	1.871	1.8663	1.8844	-.0181
J	1.630	1.6233	1.6314	-.0081	J	1.847	1.8544	1.8864	-.0320
J	1.630	1.6297	1.6358	-.0061	J	1.835	1.8433	1.8884	-.0451
A	1.648	1.6379	1.6405	-.0026	A	1.822	1.8333	1.8904	-.0571
S	1.650	1.6478	1.6452	+.0026	S	1.816	1.8247	1.8925	-.0678
O	1.641	1.6589	1.6502	+.0087	O	1.807	1.8176	1.8945	-.0769
N	1.651	1.6705	1.6555	+.0150	N	1.809	1.8123	1.8965	-.0842
D	1.674	1.6820	1.6609	+.0211	D	1.825	1.8091	1.8986	-.0895
1899					1904				
J	1.710	1.6928	1.6664	+.0264	J	1.832	1.8082	1.9007	-.0925
F	1.726	1.7026	1.6721	+.0305	F	1.818	1.8098	1.9027	-.0929
M	1.725	1.7110	1.6781	+.0329	M	1.818	1.8139	1.9046	-.0907
A	1.731	1.7180	1.6842	+.0338	A	1.829	1.8205	1.9065	-.0860
M	1.715	1.7236	1.6904	+.0332	M	1.818	1.8292	1.9083	-.0791
J	1.709	1.7278	1.6969	+.0309	J	1.820	1.8397	1.9101	-.0704
J	1.725	1.7309	1.7034	+.0275	J	1.839	1.8515	1.9117	-.0602
A	1.735	1.7326	1.7100	+.0226	A	1.854	1.8642	1.9134	-.0492
S	1.730	1.7332	1.7166	+.0166	S	1.873	1.8774	1.9148	-.0374
O	1.728	1.7327	1.7232	+.0095	O	1.897	1.8907	1.9163	-.0256
N	1.737	1.7311	1.7300	+.0011	N	1.915	1.9038	1.9177	-.0139
D	1.714	1.7286	1.7368	-.0082	D	1.922	1.9166	1.9191	-.0025
1900					1905				
J	1.719	1.7257	1.7436	-.0179	J	1.935	1.9287	1.9204	+.0083
F	1.728	1.7226	1.7502	-.0276	F	1.956	1.9398	1.9217	+.0181
M	1.739	1.7200	1.7568	-.0368	M	1.969	1.9498	1.9230	+.0268
A	1.747	1.7183	1.7633	-.0450	A	1.962	1.9584	1.9243	+.0341
M	1.729	1.7182	1.7695	-.0513	M	1.940	1.9654	1.9253	+.0401
J	1.718	1.7200	1.7754	-.0554	J	1.948	1.9708	1.9265	+.0443
J	1.716	1.7242	1.7814	-.0572	J	1.962	1.9746	1.9276	+.0470
A	1.720	1.7309	1.7872	-.0563	A	1.980	1.9772	1.9287	+.0485
S	1.712	1.7402	1.7930	-.0528	S	1.984	1.9787	1.9300	+.0487
O	1.727	1.7517	1.7984	-.0467	O	1.988	1.9798	1.9311	+.0487
N	1.755	1.7653	1.8036	-.0383	N	1.983	1.9808	1.9324	+.0484
D	1.786	1.7803	1.8086	-.0283	D	1.987	1.9821	1.9336	+.0485
1901					1906				
J	1.806	1.7962	1.8131	-.0169	J	1.999	1.9840	1.9350	+.0490
F	1.820	1.8122	1.8177	-.0055	F	1.997	1.9865	1.9362	+.0503
M	1.834	1.8276	1.8218	+.0058	M	1.989	1.9894	1.9375	+.0519
A	1.871	1.8416	1.8258	+.0158	A	1.983	1.9924	1.9387	+.0537
M	1.854	1.8538	1.8297	+.0241	M	1.972	1.9954	1.9400	+.0554
J	1.894	1.8639	1.8332	+.0307	J	1.980	1.9978	1.9412	+.0566
J	1.858	1.8717	1.8366	+.0351	J	1.972	1.9995	1.9423	+.0572
A	1.869	1.8774	1.8398	+.0376	A	2.004	2.0002	1.9434	+.0568
S	1.872	1.8815	1.8430	+.0385	S	2.017	1.9997	1.9448	+.0549
O	1.874	1.8846	1.8458	+.0388	O	2.012	1.9978	1.9456	+.0522
N	1.891	1.8874	1.8486	+.0388	N	2.011	1.9943	1.9467	+.0476
D	1.885	1.8904	1.8512	+.0392	D	2.007	1.9889	1.9477	+.0412

TABLE 17—Continued

AMERICAN RAILROAD STOCK PRICES

Date	1	2	3	4	Date	1	2	3	4
1907					1912				
J	1.992	1.9812	1.9486	+.0326	J	1.969	1.9700	1.9755	-.0055
F	1.975	1.9712	1.9494	+.0218	F	1.965	1.9718	1.9732	-.0014
M	1.930	1.9590	1.9500	+.0090	M	1.974	1.9744	1.9707	+.0037
A	1.932	1.9448	1.9506	-.0058	A	1.984	1.9773	1.9684	+.0089
M	1.918	1.9294	1.9511	-.0217	M	1.981	1.9804	1.9653	+.0151
J	1.907	1.9137	1.9515	-.0378	J	1.979	1.9830	1.9628	+.0202
J	1.923	1.8986	1.9518	-.0532	J	1.979	1.9847	1.9599	+.0248
A	1.897	1.8852	1.9520	-.0668	A	1.990	1.9852	1.9573	+.0279
S	1.898	1.8743	1.9521	-.0778	S	1.990	1.9843	1.9542	+.0301
O	1.858	1.8663	1.9521	-.0858	O	1.987	1.9818	1.9516	+.0302
N	1.832	1.8615	1.9521	-.0906	N	1.984	1.9774	1.9489	+.0285
D	1.851	1.8599	1.9521	-.0922	D	1.972	1.9724	1.9463	+.0261
1908					1913				
J	1.868	1.8613	1.9521	-.0908	J	1.970	1.9660	1.9436	+.0224
F	1.851	1.8653	1.9521	-.0868	F	1.958	1.9590	1.9413	+.0177
M	1.863	1.8716	1.9521	-.0805	M	1.949	1.9518	1.9390	+.0128
A	1.883	1.8799	1.9522	-.0723	A	1.948	1.9448	1.9367	+.0081
M	1.907	1.8897	1.9522	-.0625	M	1.936	1.9383	1.9345	+.0038
J	1.908	1.9003	1.9526	-.0523	J	1.915	1.9327	1.9325	+.0002
J	1.920	1.9123	1.9528	-.0405	J	1.921	1.9280	1.9305	+.0025
A	1.934	1.9242	1.9532	-.0290	A	1.928	1.9244	1.9286	-.0042
S	1.931	1.9358	1.9533	-.0175	S	1.929	1.9216	1.9269	-.0053
O	1.937	1.9470	1.9540	-.0070	O	1.919	1.9195	1.9253	-.0058
N	1.963	1.9577	1.9546	+.0031	N	1.909	1.9178	1.9237	-.0059
D	1.974	1.9669	1.9554	+.0115	D	1.908	1.9160	1.9221	-.0061
1909					1914				
J	1.980	1.9757	1.9562	+.0195	J	1.921	1.9138	1.9206	-.0068
F	1.971	1.9834	1.9573	+.0261	F	1.924	1.9109	1.9191	-.0082
M	1.978	1.9909	1.9584	+.0325	M	1.912	1.9073	1.9177	-.0104
A	1.994	1.9978	1.9596	+.0382	A	1.902	1.9030	1.9162	-.0132
M	2.004	2.0041	1.9608	+.0433	M	1.905	1.8979	1.9148	-.0169
J	2.009	2.0097	1.9621	+.0476	J	1.902	1.8924	1.9134	-.0210
J	2.017	2.0147	1.9635	+.0512	J	1.879	1.8865	1.9120	-.0255
A	2.025	2.0179	1.9650	+.0529	A	<i>1.875²⁶</i>	1.8805	1.9106	-.0301
S	2.022	2.0201	1.9667	+.0534	S	<i>1.877²⁶</i>	1.8749	1.9091	-.0342
O	2.021	2.0198	1.9684	+.0514	O	<i>1.867²⁶</i>	1.8697	1.9078	-.0381
N	2.013	2.0180	1.9701	+.0479	N	<i>1.862²⁶</i>	1.8653	1.9064	-.0411
D	2.019	2.0149	1.9717	+.0432	D	1.858	1.8626	1.9048	-.0422
1910					1915				
J	2.011	2.0095	1.9733	+.0362	J	1.865	1.8612	1.9031	-.0419
F	1.997	2.0030	1.9751	+.0279	F	1.857	1.8615	1.9018	-.0403
M	2.007	1.9965	1.9767	+.0198	M	1.865	1.8635	1.9003	-.0368
A	1.999	1.9896	1.9782	+.0114	A	1.887	1.8671	1.8988	-.0317
M	1.993	1.9830	1.9797	+.0033	M	1.876	1.8717	1.8972	-.0255
J	1.971	1.9773	1.9811	-.0038	J	1.872	1.8771	1.8959	-.0188
J	1.949	1.9728	1.9824	-.0096	J	1.862	1.8828	1.8945	-.0117
A	1.958	1.9696	1.9837	-.0141	A	1.875	1.8884	1.8931	-.0047
S	1.960	1.9679	1.9849	-.0170	S	1.886	1.8936	1.8916	+.0020
O	1.978	1.9676	1.9858	-.0182	O	1.909	1.8984	1.8904	+.0080
N	1.974	1.9683	1.9867	-.0184	N	1.928	1.9027	1.8891	+.0136
D	1.963	1.9699	1.9874	-.0175	D	1.925	1.9065	1.8878	+.0187
1911					1916				
J	1.974	1.9718	1.9879	-.0161	J	1.917	1.9101	1.8865	+.0236
F	1.980	1.9737	1.9881	-.0144	F	1.907	1.9132	1.8854	+.0278
M	1.975	1.9752	1.9881	-.0129	M	1.905	1.9157	1.8842	+.0315
A	1.975	1.9762	1.9878	-.0116	A	1.902	1.9177	1.8829	+.0348
M	1.982	1.9764	1.9875	-.0111	M	1.914	1.9191	1.8816	+.0375
J	1.992	1.9758	1.9867	-.0109	J	1.920	1.9198	1.8804	+.0394
J	1.992	1.9746	1.9854	-.0108	J	1.916	1.9199	1.8791	+.0408
A	1.972	1.9731	1.9839	-.0108	A	1.913	1.9195	1.8778	+.0417
S	1.949	1.9714	1.9822	-.0108	S	1.919	1.9188	1.8765	+.0423
O	1.956	1.9700	1.9807	-.0107	O	1.930	1.9177	1.8752	+.0425
N	1.972	1.9691	1.9793	-.0102	N	1.927	1.9160	1.8737	+.0423
D	1.970	1.9691	1.9775	-.0084	D	1.919	1.9135	1.8724	+.0411

*Interpolated—Stock Exchange closed.

RAILROAD STOCK PRICES

A213

TABLE 17—Continued

AMERICAN RAILROAD STOCK PRICES

Date	1	2	3	4	Date	1	2	3	4
1917					1922				
J	1.910	1.9098	1.8708	+ .0390	J	1.766	1.7799	1.7884	- .0085
F	1.887	1.9045	1.8694	+ .0351	F	1.781	1.7906	1.7894	+ .0012
M	1.892	1.8975	1.8678	+ .0297	M	1.779	1.8014	1.7903	+ .0111
A	1.887	1.8988	1.8661	+ .0227	A	1.818	1.8120	1.7915	+ .0205
A	1.869	1.8785	1.8641	+ .0144	M	1.827	1.8219	1.7927	+ .0292
M	1.875	1.8670	1.8624	+ .0046	J	1.822	1.8308	1.7940	+ .0368
J	1.869	1.8549	1.8604	- .0055	J	1.839	1.8385	1.7953	+ .0432
J	1.863	1.8428	1.8584	- .0156	A	1.859	1.8446	1.7970	+ .0476
S	1.844	1.8312	1.8560	- .0248	S	1.865	1.8489	1.7985	+ .0504
O	1.825	1.8207	1.8538	- .0331	O	1.865	1.8512	1.8002	+ .0510
N	1.791	1.8117	1.8515	- .0398	N	1.840	1.8514	1.8020	+ .0494
D	1.776	1.8044	1.8489	- .0445	D	1.830	1.8495	1.8040	+ .0455
1918					1923				
J	1.795	1.7991	1.8465	- .0474	J	1.830	1.8458	1.8061	+ .0397
F	1.800	1.7959	1.8439	- .0480	F	1.843	1.8406	1.8084	+ .0322
M	1.797	1.7946	1.8411	- .0465	M	1.845	1.8346	1.8105	+ .0241
A	1.788	1.7952	1.8384	- .0432	A	1.839	1.8281	1.8129	+ .0152
A	1.802	1.7975	1.8355	- .0380	M	1.823	1.8217	1.8178	+ .0065
M	1.804	1.8012	1.8325	- .0313	J	1.819	1.8158	1.8178	- .0020
J	1.806	1.8060	1.8295	- .0235	J	1.801	1.8106	1.8204	- .0098
A	1.816	1.8115	1.8266	- .0151	A	1.799	1.8063	1.8232	- .0169
S	1.819	1.8171	1.8238	- .0067	S	1.801	1.8029	1.8259	- .0230
O	1.836	1.8227	1.8209	+ .0018	O	1.797	1.8008	1.8288	- .0280
N	1.847	1.8277	1.8182	+ .0095	N	1.804	1.7999	1.8317	- .0318
D	1.829	1.8319	1.8154	+ .0165	D	1.803	1.8004	1.8349	- .0345
1919					1924				
J	1.818	1.8351	1.8122	+ .0229	J	1.810	1.8026	1.8381	- .0355
F	1.819	1.8371	1.8099	+ .0272	F	1.813	1.8064	1.8414	- .0350
M	1.823	1.8378	1.8072	+ .0306	M	1.810	1.8119	1.8448	- .0329
A	1.825	1.8371	1.8045	+ .0326	A	1.816	1.8190	1.8483	- .0293
A	1.848	1.8351	1.8018	+ .0333	M	1.817	1.8272	1.8518	- .0246
J	1.849	1.8317	1.7996	+ .0321	J	1.829	1.8361	1.8555	- .0194
J	1.847	1.8268	1.7974	+ .0294	J	1.849	1.8453	1.8592	- .0139
A	1.818	1.8206	1.7954	+ .0252	A	1.861	1.8543	1.8629	- .0086
S	1.810	1.8135	1.7935	+ .0200	S	1.858	1.8627	1.8667	- .0040
O	1.815	1.8058	1.7917	+ .0141	O	1.853	1.8702	1.8706	- .0004
N	1.801	1.7980	1.7903	+ .0377	N	1.882	1.8770	1.8746	+ .0024
D	1.781	1.7907	1.7889	+ .0018	D	1.904	1.8829	1.8786	+ .0043
1920					1925				
J	1.782	1.7844	1.7877	- .0033	J	1.907	1.8883	1.8827	+ .0056
F	1.764	1.7795	1.7866	- .0071	F	1.908	1.8932	1.8869	+ .0063
M	1.790	1.7763	1.7857	- .0094	M	1.896	1.8978	1.8911	+ .0067
A	1.774	1.7747	1.7849	- .0102	A	1.883	1.9020	1.8954	+ .0066
A	1.758	1.7745	1.7843	- .0098	M	1.895	1.9060	1.8997	+ .0063
M	1.754	1.7754	1.7839	- .0085	J	1.897	1.9098	1.9041	+ .0057
J	1.760	1.7769	1.7835	- .0066	J	1.901	1.9136	1.9086	+ .0050
J	1.775	1.7783	1.7830	- .0047	A	1.916	1.9173	1.9133	+ .0040
S	1.800	1.7792	1.7827	- .0035	S	1.920	1.9212	1.9180	+ .0032
O	1.819	1.7794	1.7826	- .0032	O	1.926	1.9253	1.9228	+ .0025
N	1.806	1.7785	1.7825	- .0040	N	1.938	1.9296	1.9277	+ .0019
D	1.764	1.7765	1.7826	- .0061	D	1.957	1.9341	1.9328	+ .0013
1921					1926				
J	1.776	1.7733	1.7826	- .0093	J	1.957	1.9386	1.9380	+ .0006
F	1.771	1.7692	1.7827	- .0135	F	1.950	1.9429	1.9434	- .0005
M	1.750	1.7644	1.7830	- .0186	M	1.931	1.9470	1.9488	- .0018
A	1.742	1.7593	1.7832	- .0239	A	1.934	1.9507	1.9543	- .0036
A	1.759	1.7546	1.7836	- .0290	M	1.938	1.9541	1.9601	- .0060
J	1.732	1.7506	1.7839	- .0333	J	1.956	1.9576	1.9661	- .0085
J	1.750	1.7482	1.7842	- .0360	J	1.964	1.9614	1.9719	- .0105
S	1.758	1.7479	1.7848	- .0369	A	1.976	1.9658	1.9778	- .0120
O	1.762	1.7499	1.7854	- .0355	S	1.989	1.9711	1.9843	- .0132
N	1.755	1.7545	1.7861	- .0316	O	1.976	1.9775	1.9907	- .0132
D	1.767	1.7613	1.7868	- .0255	N	1.979	1.9848	1.9972	- .0124
	1.768	1.7699	1.7874	- .0175	D	1.987	1.9929	2.0037	- .0108

TABLE 17—Concluded

AMERICAN RAILROAD STOCK PRICES

Date	1	2	3	4	Date	1	2	3	4
1927					1932				
J	1.993	2.0013	2.0100	-.0087	J	1.505	1.4818		
F	2.011	2.0090	2.0168	-.0069	F	1.503	1.4330		
M	2.016	2.0182	2.0234	-.0052	M	1.469	1.3909		
A	2.026	2.0261	2.0300	-.0039	A	1.328	1.3566		
M	2.035	2.0335	2.0365	-.0030	M	1.192	1.3304		
J	2.042	2.0403	2.0433	-.0030	J	1.129	1.3125		
J	2.050	2.0463	2.0499	-.0036	J	1.201	1.3032		
A	2.055	2.0516	2.0565	-.0049	A	1.409	1.3028		
S	2.062	2.0560	2.0629	-.0069	S	1.445	1.3113		
O	2.061	2.0555	2.0694	-.0099	O	1.418	1.3278		
N	2.058	2.0621	2.0753	-.0137	N	1.387	1.3512		
D	2.067	2.0639	2.0817	-.0178	D	1.367	1.3793		
1928					1933				
J	2.060	2.0650	2.0876	-.0226	J	1.400	1.4098		
F	2.049	2.0657	2.0931	-.0274	F	1.377	1.4407		
M	2.063	2.0662	2.0983	-.0321	M	1.376	1.4701		
A	2.081	2.0667	2.1031	-.0364	A	1.406	1.4972		
M	2.088	2.0574	2.1078	-.0404	M	1.540	1.5220		
J	2.066	2.0586	2.1115	-.0429	J	1.606	1.5447		
J	2.060	2.0703	2.1149	-.0446	J	1.662	1.5657		
A	2.067	2.0730	2.1176	-.0446	A	1.659	1.5850		
S	2.078	2.0767	2.1199	-.0432	S	1.633	1.6024		
O	2.073	2.0817	2.1211	-.0394	O	1.550	1.6168		
N	2.095	2.0878	2.1215	-.0337	N	1.549	1.6275		
D	2.097	2.0950	2.1209	-.0259	D	1.572	1.6335		
1929					1934				
J	2.116	2.1028	2.1201	-.0173	J	1.620	1.6342		
F	2.110	2.1108	2.1177	-.0069	F	1.663	1.6301		
M	2.109	2.1185	2.1145	+ .0040	M	1.647	1.6219		
A	2.103	2.1252	2.1105	+ .0147	A	1.652	1.6107		
M	2.109	2.1309	2.1056	+ .0253	M	1.605			
J	2.126	2.1352			J	1.606			
J	2.166	2.1380			J	1.555			
A	2.184	2.1393			A	1.516			
S	2.189	2.1392			S	1.506			
O	2.133	2.1374			O	1.518			
N	2.087	2.1339			N	1.512			
D	2.097	2.1285			D	1.525			
1930					1935				
J	2.094	2.1212			J	1.510			
F	2.116	2.1121			F	1.485			
M	2.118	2.1016			M	1.427			
A	2.110	2.0900			A	1.440			
M	2.088	2.0777			M	1.463			
J	2.061	2.0653			J	1.479			
J	2.061	2.0528			J	1.501			
A	2.049	2.0404			A	1.525			
S	2.041	2.0277			S	1.533			
O	2.008	2.0144			O	1.505			
N	1.970	2.0001			N	1.552			
D	1.931	1.9848			D	1.584			
1931					1936				
J	1.958	1.9681			J	1.617			
F	1.983	1.9499							
M	1.954	1.9298							
A	1.903	1.9067							
M	1.849	1.8795							
J	1.831	1.8466							
J	1.840	1.8074							
A	1.787	1.7613							
S	1.712	1.7091							
O	1.655	1.6325							
N	1.614	1.5939							
D	1.502	1.5362							

TABLE 18

PRICE OF GOLD IN GREENBACKS JANUARY 1862-DECEMBER 1878¹

MONTHLY AVERAGES

Date		Date		Date		Date		Date	
1862		1865		1868		1872		1875	
J	102.5	J	140.1	N	134.4	M	110.1	A	113.5
F	103.5	J	142.1	D	135.2	A	111.1	S	115.8
M	101.8	A	143.5	1869		M	113.7	O	116.4
A	101.5	S	143.9	J	135.6	J	113.9	N	114.7
M	103.3	O	145.5	F	134.4	J	114.3	D	113.9
J	106.5	N	147.0	M	131.3	A	114.4	1876	
J	115.5	D	146.2	A	132.9	S	113.5	J	112.8
A	114.5	1866		M	139.2	O	113.2	F	113.4
S	118.5	J	140.1	J	138.1	N	112.9	M	114.3
O	128.5	F	138.4	J	136.1	D	112.2	A	113.0
N	131.1	M	130.5	A	134.2	1873		M	112.6
D	132.3	A	127.3	S	136.8	J	112.7	J	112.5
1863		M	131.8	O	130.2	F	114.1	J	111.9
J	145.1	J	148.7	N	126.2	M	115.5	A	111.2
F	160.5	J	151.6	D	121.5	A	117.8	S	110.0
M	154.5	A	148.7	1870		M	117.7	O	109.7
A	151.5	S	145.5	J	121.3	J	116.5	N	109.1
M	148.9	O	148.3	F	119.5	J	115.7	D	107.9
J	144.5	N	143.8	M	112.6	A	115.4	1877	
J	130.6	D	136.7	A	113.1	S	112.7	J	106.3
A	125.8	1867		M	114.7	O	108.9	F	105.4
S	134.2	J	134.6	J	112.9	N	108.6	M	104.8
O	147.7	F	137.4	J	116.8	D	110.0	A	106.2
N	148.0	M	135.0	A	117.9	1874		M	106.9
D	151.1	A	135.6	S	114.8	J	111.4	J	105.4
1864		M	137.0	O	112.8	F	112.3	J	105.4
J	155.5	J	137.5	N	111.4	M	112.1	A	105.0
F	158.6	J	139.4	D	110.7	A	113.4	S	103.3
M	162.9	A	140.8	1871		M	112.4	O	102.8
A	172.7	S	143.4	J	110.7	J	111.3	N	102.8
M	176.3	O	143.5	F	111.5	J	110.0	D	102.8
J	210.7	N	139.6	M	111.0	A	109.7	1878	
J	258.1	D	134.8	A	110.6	S	109.7	J	102.1
A	254.1	1868		M	111.5	O	110.0	F	102.0
S	222.5	J	138.5	J	112.4	N	110.9	M	101.2
O	207.2	F	141.4	J	112.4	D	111.7	A	100.6
N	233.5	M	139.5	A	112.4	1875		M	100.7
D	227.5	A	138.7	S	114.5	J	112.5	J	100.8
1865		M	139.6	O	113.2	F	114.5	J	100.5
J	216.2	J	140.1	N	111.2	M	115.5	A	100.5
F	205.5	J	142.7	D	109.3	A	114.8	S	100.4
M	173.8	A	145.5	1872		M	115.8	O	100.5
A	148.5	S	143.6	J	109.1	J	117.0	N	100.2
M	135.6	O	137.1	F	110.3	J	114.8	D	100.1

¹W. C. Mitchell—Gold, Prices and Wages under the Greenback Standard—pp. 5-13.

TABLE 19

AN UNADJUSTED ARITHMETIC AVERAGE INDEX NUMBER OF THE YIELDS
IN *Gold*¹ OF AMERICAN RAILROAD BONDS, MONTHLY,
JANUARY 1857-JANUARY 1879

Col. 1. Index

Col. 2. Logarithms of Index

Col. 3. Cyclical Curve (logarithms)

For details of the nature of the graduation given in Column 3 of this table, see Appendix D.

¹For the meaning of gold yield see Appendix C. The nature of this index of yields in gold is such that beginning with January 1879 it is identical with the index given in Table 10, column 4.

THE GREENBACK PERIOD

A217

TABLE 19

AMERICAN RAILROAD BOND YIELDS
UNADJUSTED ARITHMETIC INDEX—GOLD

Date	Data	Loga- rithms of data	Cyclical curve (loga- rithms)	Date	Data	Loga- rithms of data	Cyclical curve (loga- rithms)	Date	Data	Loga- rithms of data	Cyclical curve (loga- rithms)
1857				1862				1867			
J	8.173	.9124	.9164	J	6.193	.7919	.7788	J	9.589	.9818	1.0005
F	8.102	.9086	.9179	F	5.996	.7779	.7743	F	9.840	.9930	.9996
M	8.107	.9089	.9211	M	5.881	.7695	.7719	M	9.693	.9865	.9990
A	8.124	.9098	.9257	A	5.725	.7578	.7724	A	9.823	.9922	.9986
M	8.195	.9136	.9313	M	5.594	.7477	.7760	M	9.962	.9984	.9987
J	8.436	.9261	.9373	J	5.701	.7560	.7831	J	10.036	1.0016	.9995
J	8.393	.9239	.9431	J	6.491	.8123	.7935	J	10.063	1.0027	1.0009
A	8.502	.9295	.9478	A	6.277	.7978	.8062	A	10.181	1.0078	1.0029
S	9.563	.9806	.9509	S	6.388	.8054	.8205	S	10.424	1.0180	1.0052
O	10.298	1.0126	.9520	O	6.925	.8404	.8353	O	10.547	1.0231	1.0078
N	9.519	.9786	.9807	N	6.986	.8442	.8494	N	10.343	1.0147	1.0102
D	9.043	.9563	.9468	D	7.123	.8527	.8617	D	10.001	1.0000	1.0123
1858				1863				1868			
J	8.715	.9403	.9403	J	7.564	.8788	.8717	J	10.186	1.0080	1.0138
F	8.171	.9123	.9314	F	8.402	.9244	.8789	F	10.358	1.0153	1.0148
M	7.838	.8942	.9205	M	8.121	.9096	.8832	M	10.196	1.0084	1.0153
A	7.773	.8906	.9082	A	8.189	.9132	.8850	A	10.201	1.0086	1.0154
M	7.660	.8842	.8954	M	8.042	.9084	.8848	M	10.245	1.0105	1.0153
J	7.570	.8791	.8828	J	7.765	.8901	.8835	J	10.284	1.0122	1.0150
J	7.508	.8753	.8713	J	6.918	.8400	.8821	J	10.506	1.0214	1.0148
A	7.471	.8744	.8616	A	6.585	.8186	.8818	A	10.781	1.0327	1.0148
S	7.346	.8661	.8538	S	7.188	.8566	.8839	S	10.741	1.0310	1.0151
O	7.113	.8521	.8482	O	8.081	.9075	.8895	O	10.314	1.0134	1.0159
N	6.992	.8446	.8445	N	8.232	.9155	.8996	N	10.200	1.0086	1.0171
D	6.940	.8414	.8424	D	8.567	.9328	.9149	D	10.344	1.0147	1.0188
1859				1864				1869			
J	6.890	.8382	.8413	J	8.973	.9529	.9352	J	10.424	1.0180	1.0208
F	6.875	.8373	.8410	F	9.148	.9613	.9599	F	10.358	1.0153	1.0230
M	6.854	.8359	.8412	M	9.263	.9668	.9880	M	10.164	1.0071	1.0249
A	6.802	.8326	.8417	A	9.677	.9857	1.0176	A	10.352	1.0150	1.0263
M	6.943	.8416	.8425	M	9.944	.9976	1.0468	M	10.814	1.0340	1.0268
J	7.139	.8536	.8434	J	11.927	1.0765	1.0735	J	10.740	1.0310	1.0260
J	7.112	.8520	.8440	J	14.043	1.1475	1.0958	J	10.674	1.0283	1.0236
A	7.032	.8471	.8440	A	13.915	1.1435	1.1124	A	10.514	1.0218	1.0194
S	6.846	.8354	.8431	S	12.925	1.1114	1.1224	S	10.832	1.0347	1.0136
O	6.877	.8374	.8410	O	12.533	1.0981	1.1257	O	10.401	1.0171	1.0062
N	6.897	.8387	.8376	N	14.067	1.1482	1.1226	N	10.092	1.0040	.9975
D	6.843	.8353	.8329	D	14.011	1.1465	1.1141	D	9.718	.9876	.9880
1860				1865				1870			
J	6.803	.8327	.8271	J	13.680	1.1361	1.1014	J	9.621	.9832	.9782
F	6.712	.8269	.8207	F	13.308	1.1241	1.0856	F	9.219	.9647	.9683
M	6.631	.8216	.8142	M	11.712	1.0686	1.0681	M	8.467	.9277	.9590
A	6.506	.8133	.8080	A	10.020	1.0009	1.0500	A	8.554	.9322	.9505
M	6.327	.8012	.8025	M	9.048	.9566	1.0325	M	8.641	.9366	.9432
J	6.158	.7894	.7980	J	9.670	.9854	1.0167	J	8.421	.9254	.9372
J	6.067	.7830	.7945	J	9.702	.9869	1.0034	J	8.769	.9430	.9327
A	6.012	.7790	.7922	A	9.868	.9942	.9935	A	8.954	.9520	.9294
S	6.009	.7788	.7910	S	9.972	.9988	.9871	S	8.728	.9409	.9274
O	6.043	.7813	.7911	O	10.204	1.0088	.9844	O	8.561	.9325	.9264
N	6.387	.8053	.7923	N	10.479	1.0203	.9850	N	8.480	.9284	.9261
D	6.729	.8280	.7946	D	10.503	1.0213	.9882	D	8.397	.9241	.9262
1861				1866				1871			
J	6.386	.8052	.7977	J	10.110	1.0048	.9929	J	8.344	.9214	.9263
F	6.286	.7984	.8013	F	10.021	1.0009	.9981	F	8.371	.9228	.9262
M	6.123	.7870	.8048	M	9.480	.9768	1.0028	M	8.316	.9199	.9259
A	6.233	.7947	.8078	A	9.143	.9611	1.0064	A	8.265	.9172	.9252
M	6.614	.8105	.8078	M	9.385	.9734	1.0083	M	8.308	.9195	.9242
J	6.537	.8154	.8104	J	10.722	1.0303	1.0088	J	8.390	.9238	.9230
J	6.291	.7987	.8044	J	10.812	1.0339	1.0082	J	8.385	.9235	.9217
A	6.288	.7985	.8067	A	10.594	1.0251	1.0068	A	8.350	.9217	.9205
S	6.384	.8051	.8025	S	10.323	1.0138	1.0051	S	8.541	.9315	.9195
O	6.432	.8084	.7970	O	10.536	1.0227	1.0037	O	8.571	.9330	.9186
N	6.351	.8028	.7909	N	10.154	1.0066	1.0024	N	8.437	.9262	.9178
D	6.312	.8002	.7846	D	9.717	.9875	1.0013	D	8.177	.9126	.9172

TABLE 19—(Concluded)
AMERICAN RAILROAD BOND YIELDS
UNADJUSTED ARITHMETIC INDEX—GOLD

Date	Data	Loga- rithms of data	Cyclical curve (loga- rithms)	Date	Data	Loga- rithms of data	Cyclical curve (loga- rithms)	Date	Data	Loga- rithms of data	Cyclica curve (loga- rithms)
1872				1875				1878			
J	7.932	.8994	.9165	J	8.226	.9152	.9174	J	6.765	.8303	.8307
F	8.011	.9037	.9160	F	8.363	.9224	.9183	F	6.745	.8290	.8278
M	8.095	.9082	.9158	M	8.433	.9260	.9192	M	6.669	.8241	.8250
A	8.181	.9128	.9159	A	8.291	.9186	.9199	A	6.607	.8200	.8224
M	8.428	.9257	.9165	M	8.342	.9213	.9203	M	6.576	.8180	.8198
J	8.419	.9253	.9178	J	8.495	.9292	.9201	J	6.507	.8134	.8173
J	8.362	.9223	.9198	J	8.242	.9160	.9193	J	6.471	.8110	.8145
A	8.459	.9273	.9225	A	8.116	.9093	.9179	A	6.514	.8139	.8116
S	8.464	.9276	.9255	S	8.265	.9172	.9159	S	6.494	.8125	.8083
O	8.499	.9294	.9288	O	8.379	.9232	.9134	O	6.468	.8108	.8048
N	8.523	.9306	.9320	N	8.182	.9129	.9106	N	6.394	.8058	.8010
D	8.500	.9294	.9350	D	8.031	.9048	.9075	D	6.311	.8001	.7972
1873				1876				1879			
J	8.471	.9279	.9374	J	7.887	.8969	.9043	J	6.188	.7916	.7932
F	8.577	.9333	.9394	F	7.857	.8953	.9009	F			.7893
M	8.723	.9407	.9408	M	7.892	.8972	.8975	M			.7856
A	8.973	.9529	.9417	A	7.825	.8935	.8940	A			.7820
M	8.957	.9522	.9422	M	7.832	.8939	.8905	M			.7789
J	8.830	.9460	.9423	J	7.790	.8915	.8870	J			.7761
J	8.704	.9397	.9420	J	7.658	.8841	.8836	J			.7738
A	8.692	.9391	.9414	A	7.568	.8790	.8803	A			.7719
S	8.591	.9340	.9403	S	7.563	.8787	.8770	S			.7705
O	8.636	.9363	.9388	O	7.541	.8774	.8739	O			.7693
N	8.680	.9385	.9368	N	7.483	.8741	.8709	N			.7683
D	8.600	.9345	.9344	D	7.374	.8677	.8679	D			.7671
1874				1877				1880			
J	8.459	.9273	.9318	J	7.185	.8564	.8651	J			.7658
F	8.429	.9258	.9290	F	7.116	.8522	.8623	F			.7640
M	8.427	.9257	.9263	M	7.177	.8559	.8595	M			.7618
A	8.534	.9312	.9238	A	7.316	.8643	.8569	A			.7590
M	8.516	.9302	.9215	M	7.330	.8651	.8542	M			.7557
J	8.363	.9224	.9196	J	7.111	.8519	.8516	J			.7519
J	8.263	.9171	.9181	J	7.047	.8480	.8488	J			.7478
A	8.214	.9146	.9170	A	7.048	.8481	.8460	A			
S	8.189	.9132	.9163	S	6.911	.8395	.8431	S			
O	8.151	.9112	.9160	O	6.896	.8386	.8400	O			
N	8.145	.9109	.9161	N	6.875	.8373	.8369	N			
D	8.220	.9149	.9166	D	6.835	.8347	.8337	D			

TABLE 20

AN INDEX NUMBER OF THE GOLD PRICES OF AMERICAN RAILROAD
COMMON STOCKS, JANUARY 1862-DECEMBER 1878

This index number was constructed by multiplying the monthly paper index figures (see Table 10) by the monthly average prices of greenbacks in gold (compare Table 18).

Col. 1. Index

Col. 2. Logarithms of Index

Col. 3. Cyclical Curve (logarithms)

For details of the nature of the graduation given in Column 3 of this table, see Appendix D.

TABLE 20

AMERICAN RAILROAD STOCK PRICES—GOLD

Date	Data	Loga- rithms of data	Cyclical curve (loga- rithms)	Date	Data	Loga- rithms of data	Cyclical curve (loga- rithms)	Date	Data	Loga- rithms of data	Cyclical curve (loga- rithms)
1860				1865				1870			
J				J	15.25	1.183	1.2042	J	31.37	1.497	1.5076
F				F	15.66	1.195	1.2186	F	32.89	1.517	1.5149
M				M	16.77	1.225	1.2364	M	34.68	1.540	1.5221
A				A	19.35	1.287	1.2561	A	35.06	1.545	1.5288
M				M	21.66	1.336	1.2761	M	35.94	1.556	1.5350
J				J	20.58	1.313	1.2952	J	36.80	1.566	1.5405
J			1.2441	J	21.17	1.326	1.3121	J	34.47	1.537	1.5454
A			1.2475	A	20.72	1.316	1.3268	A	33.53	1.525	1.5495
S			1.2488	S	21.51	1.333	1.3369	S	34.74	1.541	1.5529
O			1.2476	O	21.87	1.340	1.3436	O	35.53	1.551	1.5556
N			1.2439	N	21.84	1.339	1.3471	N	35.97	1.556	1.5578
D			1.2379	D	21.65	1.335	1.3483	D	35.77	1.554	1.5595
1861				1866				1871			
J			1.2302	J	21.56	1.334	1.3471	J	35.86	1.555	1.5609
F			1.2212	F	21.29	1.328	1.3461	F	35.98	1.556	1.5622
M			1.2119	M	22.63	1.355	1.3453	M	36.91	1.567	1.5634
A			1.2034	A	23.60	1.373	1.3449	A	38.01	1.580	1.5650
M			1.1963	M	23.26	1.367	1.3455	M	38.57	1.586	1.5667
J			1.1912	J	20.87	1.320	1.3468	J	37.99	1.580	1.5686
J			1.1886	J	20.85	1.319	1.3488	J	37.30	1.572	1.5707
A			1.1884	A	22.04	1.343	1.3510	A	37.54	1.574	1.5729
S			1.1904	S	22.64	1.355	1.3531	S	37.00	1.568	1.5751
O			1.1943	O	22.88	1.359	1.3550	O	35.54	1.551	1.5772
N			1.1997	N	23.25	1.366	1.3565	N	36.48	1.562	1.5792
D			1.2061	D	23.99	1.380	1.3577	D	37.86	1.578	1.5811
1862				1867				1872			
J	16.14	1.208	1.2130	J	23.41	1.369	1.3585	J	38.78	1.589	1.5829
F	16.54	1.219	1.2197	F	22.73	1.357	1.3592	F	38.59	1.586	1.5846
M	17.33	1.239	1.2257	M	22.98	1.364	1.3598	M	39.83	1.600	1.5863
A	17.25	1.237	1.2306	A	22.35	1.349	1.3605	A	40.68	1.609	1.5878
M	17.75	1.249	1.2340	M	22.40	1.350	1.3615	M	39.63	1.598	1.5892
J	18.06	1.257	1.2360	J	23.07	1.363	1.3628	J	39.12	1.592	1.5905
J	16.28	1.212	1.2368	J	23.57	1.372	1.3646	J	38.67	1.587	1.5913
A	16.97	1.230	1.2370	A	23.45	1.370	1.3671	A	38.08	1.581	1.5918
S	17.58	1.245	1.2374	S	22.99	1.362	1.3703	S	37.91	1.579	1.5916
O	17.81	1.251	1.2385	O	22.94	1.361	1.3741	O	37.92	1.579	1.5908
N	17.61	1.246	1.2412	N	23.49	1.371	1.3783	N	37.81	1.578	1.5893
D	17.80	1.250	1.2459	D	24.70	1.393	1.3829	D	39.04	1.592	1.5872
1863				1868				1873			
J	18.33	1.263	1.2529	J	24.91	1.396	1.3876	J	39.25	1.594	1.5846
F	17.15	1.234	1.2621	F	24.96	1.397	1.3921	F	39.24	1.594	1.5815
M	17.49	1.243	1.2735	M	25.18	1.401	1.3964	M	38.47	1.585	1.5780
A	18.06	1.257	1.2869	A	25.17	1.401	1.4005	A	37.07	1.569	1.5742
M	20.13	1.304	1.3017	M	25.86	1.413	1.4046	M	37.17	1.570	1.5702
J	20.07	1.303	1.3172	J	26.21	1.418	1.4086	J	37.20	1.571	1.5659
J	22.74	1.357	1.3326	J	25.74	1.411	1.4129	J	37.33	1.572	1.5616
A	25.27	1.403	1.3466	A	24.97	1.397	1.4176	A	37.26	1.571	1.5573
S	23.71	1.375	1.3581	S	25.52	1.407	1.4226	S	35.25	1.547	1.5532
O	22.13	1.345	1.3657	O	27.13	1.433	1.4279	O	33.43	1.524	1.5494
N	22.16	1.346	1.3684	N	26.90	1.430	1.4334	N	32.34	1.510	1.5464
D	21.51	1.333	1.3652	D	27.29	1.436	1.4388	D	34.80	1.542	1.5441
1864				1869				1874			
J	21.77	1.338	1.3561	J	28.18	1.440	1.4440	J	36.20	1.559	1.5428
F	22.39	1.350	1.3414	F	28.66	1.457	1.4488	F	36.95	1.568	1.5424
M	23.33	1.368	1.3219	M	29.13	1.464	1.4532	M	36.33	1.560	1.5430
A	22.40	1.350	1.2992	A	29.25	1.466	1.4574	A	34.94	1.543	1.5441
M	20.97	1.322	1.2750	M	29.14	1.464	1.4614	M	34.35	1.536	1.5456
J	17.90	1.253	1.2512	J	29.66	1.472	1.4654	J	34.41	1.537	1.5472
J	14.45	1.160	1.2295	J	30.04	1.478	1.4698	J	34.64	1.542	1.5484
A	14.82	1.171	1.2115	A	30.87	1.490	1.4747	A	35.13	1.546	1.5489
S	15.90	1.201	1.1985	S	28.33	1.452	1.4802	S	35.65	1.552	1.5487
O	16.01	1.204	1.1911	O	29.52	1.470	1.4863	O	35.45	1.550	1.5475
N	14.93	1.174	1.1897	N	30.22	1.480	1.4931	N	35.22	1.547	1.5454
D	15.22	1.182	1.1843	D	30.88	1.490	1.5002	D	35.03	1.544	1.5425

TABLE 20—(Concluded)

AMERICAN RAILROAD STOCK PRICES—GOLD

Date	Data	Loga- rithms of data	Cyclical curve (loga- rithms)	Date	Data	Loga- rithms of data	Cyclical curve (loga- rithms)	Date	Data	Loga- rithms of data	Cyclical curve (loga- rithms)
1875				1877				1879			
J	35.04	1.545	1.5390	J	28.47	1.454	1.4218	J			1.4879
F	34.28	1.535	1.5351	F	26.91	1.430	1.4111	F			1.4959
M	34.33	1.536	1.5311	M	25.81	1.412	1.4028	M			1.5058
A	34.89	1.543	1.5274	A	23.62	1.373	1.3969	A			1.5176
M	33.08	1.520	1.5241	M	23.37	1.369	1.3934	M			1.5311
J	32.13	1.507	1.5215	J	22.39	1.350	1.3922	J			1.5460
J	32.83	1.516	1.5197	J	23.15	1.365	1.3931	J			1.5616
A	33.30	1.522	1.5187	A	24.72	1.393	1.3961	A			1.5773
S	32.33	1.510	1.5183	S	26.81	1.428	1.4010	S			1.5923
O	31.70	1.501	1.5184	O	27.71	1.443	1.4074	O			1.6059
N	32.60	1.513	1.5188	N	27.21	1.435	1.4153	N			1.6178
D	32.82	1.516	1.5192	D	27.09	1.433	1.4239	D			1.6278
1876				1878				1880			
J	33.92	1.530	1.5193	J	27.26	1.436	1.4326	J			1.6359
F	34.28	1.535	1.5190	F	26.73	1.427	1.4408	F			1.6424
M	34.14	1.533	1.5179	M	27.42	1.438	1.4481	M			
A	33.17	1.521	1.5156	A	28.44	1.454	1.4540	A			
M	31.91	1.504	1.5117	M	28.42	1.454	1.4586	M			
J	31.65	1.500	1.5060	J	29.15	1.465	1.4620	J			
J	31.49	1.498	1.4980	J	29.76	1.474	1.4647	J			
A	30.25	1.481	1.4879	A	29.41	1.469	1.4670	A			
S	28.82	1.460	1.4758	S	30.08	1.478	1.4695	S			
O	28.63	1.457	1.4623	O	29.76	1.474	1.4725	O			
N	28.17	1.450	1.4482	N	29.74	1.473	1.4765	N			
D	28.29	1.452	1.4344	D	29.66	1.472	1.4814	D			

TABLE 21

CALL MONEY RATES AT THE NEW YORK STOCK
EXCHANGE

MONTHLY AVERAGES, JANUARY 1857 - JANUARY 1936

- Col. 1. Logarithms of Data Adjusted for Seasonal Fluctuations.
- Col. 2. Cyclical Curve (logarithms).
- Col. 3. Trend Curve (logarithms).
- Col. 4. Deviations of Cyclical Curve
(logarithms) from Trend Curve
(logarithms).
- Col. 5. Changing Seasonal Fluctuations
(logarithms).

For details of the nature of the graduations given in Columns 2 and 3 and of the seasonal given in Column 5 of this table, see Appendix D

SHORT TERM INTEREST RATES

A223

TABLE 21

CALL MONEY RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1857						1862					
J	.874	.8813	.8353	+.0460	+.029	J	.775	.7523	.7596	-.0073	+.038
F	.927	.9040	.8300	+.0740	+.015	F	.776	.7427	.7616	-.0189	+.002
M	.969	.9279	.8249	+.1030	-.003	M	.734	.7320	.7636	-.0316	+.006
A	.936	.9501	.8199	+.1302	-.039	A	.759	.7212	.7655	-.0443	-.019
M	.906	.9682	.8150	+.1532	-.038	M	.689	.7109	.7672	-.0563	-.029
J	.876	.9798	.8099	+.1699	-.056	J	.653	.7022	.7686	-.0664	-.040
J	.860	.9828	.8051	+.1777	-.031	J	.756	.6963	.7700	-.0737	-.024
A	.985	.9763	.8004	+.1759	-.007	A	.639	.6935	.7711	-.0776	-.037
S	1.122	.9604	.7958	+.1646	+.054	S	.640	.6942	.7720	-.0778	-.007
O	1.225	.9351	.7913	+.1438	+.030	O	.642	.6989	.7728	-.0739	+.021
N	.880	.9012	.7869	+.1143	+.023	N	.757	.7072	.7736	-.0664	+.042
D	.823	.8603	.7828	+.0775	+.022	D	.735	.7187	.7743	-.0556	+.043
1858						1863					
J	.783	.8136	.7788	+.0348	+.030	J	.745	.7325	.7748	-.0423	+.040
F	.676	.7629	.7749	-.0120	+.012	F	.801	.7477	.7753	-.0276	-.002
M	.680	.7113	.7712	-.0599	-.003	M	.775	.7625	.7758	-.0133	+.010
A	.663	.6616	.7677	-.1061	-.040	A	.721	.7756	.7763	-.0007	-.005
M	.573	.6170	.7643	-.1473	-.029	M	.757	.7865	.7768	+.0097	-.033
J	.606	.5808	.7611	-.1803	-.050	J	.827	.7943	.7772	-.0171	-.042
J	.572	.5558	.7581	-.2023	-.028	J	.811	.7991	.7776	-.0215	-.026
A	.555	.5434	.7552	-.2118	-.011	A	.826	.8018	.7781	-.0237	-.048
S	.575	.5433	.7524	-.2091	+.040	S	.830	.8032	.7786	-.0246	-.010
O	.525	.5547	.7499	-.1952	+.025	O	.791	.8040	.7790	+.0250	+.022
N	.582	.5752	.7473	-.1721	+.025	N	.800	.8051	.7794	+.0257	+.045
D	.577	.6015	.7449	-.1434	+.025	D	.794	.8071	.7798	+.0273	+.051
1859						1864					
J	.603	.6308	.7427	-.1119	+.031	J	.802	.8099	.7801	+.0298	+.043
F	.689	.6605	.7406	-.0801	+.010	F	.792	.8135	.7802	+.0333	+.007
M	.659	.6884	.7387	-.0503	-.002	M	.756	.8176	.7803	+.0373	+.015
A	.693	.7132	.7367	-.0235	-.040	A	.824	.8216	.7804	+.0412	+.009
M	.792	.7344	.7349	-.0005	-.023	M	.788	.8250	.7803	+.0447	-.040
J	.820	.7512	.7332	+.0180	-.045	J	.872	.8274	.7800	+.0474	-.046
J	.772	.7632	.7316	+.0316	-.025	J	.866	.8285	.7796	+.0489	-.033
A	.820	.7706	.7301	+.0405	-.015	A	.903	.8279	.7792	+.0487	-.064
S	.749	.7735	.7286	+.0449	+.026	S	.855	.8256	.7784	+.0472	-.010
O	.758	.7723	.7275	+.0448	+.022	O	.807	.8217	.7776	+.0441	+.026
N	.691	.7682	.7264	+.0418	+.029	N	.793	.8163	.7767	+.0396	+.046
D	.737	.7626	.7253	+.0373	+.027	D	.758	.8096	.7757	+.0339	+.062
1860						1865					
J	.791	.7569	.7242	+.0327	+.034	J	.800	.8023	.7746	+.0277	+.045
F	.761	.7523	.7237	+.0286	+.008	F	.795	.7952	.7735	+.0217	-.010
M	.740	.7499	.7232	+.0267	-.000	M	.824	.7888	.7724	+.0164	+.021
A	.756	.7501	.7228	+.0273	-.036	A	.723	.7840	.7714	+.0126	+.025
M	.746	.7527	.7226	+.0301	-.021	M	.781	.7810	.7703	+.0107	-.049
J	.719	.7571	.7228	+.0343	-.042	J	.743	.7800	.7695	+.0105	-.053
J	.742	.7627	.7232	+.0395	-.022	J	.783	.7805	.7686	+.0119	-.043
A	.771	.7683	.7237	+.0446	-.020	A	.854	.7816	.7679	+.0137	-.083
S	.800	.7729	.7246	+.0483	+.013	S	.783	.7823	.7673	+.0150	-.005
O	.809	.7761	.7258	+.0503	+.020	O	.810	.7814	.7669	+.0145	+.035
N	.819	.7776	.7272	+.0504	+.034	N	.787	.7781	.7667	+.0114	+.046
D	.828	.7772	.7287	+.0485	+.032	D	.756	.7717	.7666	+.0051	+.077
1861						1866					
J	.724	.7753	.7304	+.0449	+.036	J	.692	.7629	.7669	-.0040	+.048
F	.735	.7728	.7325	+.0403	+.005	F	.797	.7520	.7674	-.0154	-.015
M	.757	.7700	.7347	+.0353	+.003	M	.717	.7403	.7681	-.0278	+.028
A	.740	.7676	.7371	+.0305	-.030	A	.690	.7289	.7690	-.0401	+.041
M	.817	.7662	.7394	+.0268	-.021	M	.788	.7192	.7701	-.0509	-.056
J	.781	.7661	.7420	+.0241	-.041	J	.751	.7117	.7715	-.0598	-.063
J	.762	.7666	.7446	+.0220	-.022	J	.748	.7071	.7729	-.0658	-.060
A	.681	.7676	.7472	+.0204	-.028	A	.719	.7056	.7746	-.0690	-.103
S	.759	.7682	.7498	+.0184	+.001	S	.620	.7065	.7767	-.0702	+.002
O	.793	.7675	.7524	+.0151	+.020	O	.594	.7099	.7786	-.0687	+.044
N	.775	.7647	.7548	+.0099	+.038	N	.734	.7150	.7807	-.0657	+.044
D	.777	.7597	.7574	+.0023	+.036	D	.708	.7214	.7832	-.0618	+.097

TABLE 21—Continued

CALL MONEY RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1867						1872					
J	.805	.7287	.7860	-.0573	+.051	J	.868	.8347	.8312	+.0035	+.075
F	.784	.7376	.7884	-.0508	-.020	F	.861	.8472	.8301	+.0171	-.020
M	.749	.7478	.7909	-.0431	+.033	M	.874	.8545	.8286	+.0259	+.052
A	.734	.7589	.7936	-.0347	+.058	A	1.025	.8588	.8269	+.0319	+.111
M	.745	.7708	.7964	-.0256	-.064	M	.874	.8599	.8247	+.0352	-.082
J	.868	.7823	.7989	-.0166	-.076	J	.796	.8591	.8227	+.0364	-.143
J	.730	.7919	.8014	-.0095	-.077	J	.726	.8581	.8203	+.0378	-.164
A	.748	.7983	.8039	-.0056	-.120	A	.756	.8590	.8176	+.0414	-.175
S	.741	.8014	.8067	-.0053	+.010	S	1.002	.8631	.8146	+.0485	+.012
O	.979	.8004	.8089	-.0085	+.053	O	.720	.8724	.8115	+.0609	+.088
N	.819	.7958	.8113	-.0155	+.040	N	.838	.8888	.8080	+.0308	+.050
D	.697	.7898	.8135	-.0237	+.116	D	1.108	.9120	.8043	+.1077	+.194
1868						1873					
J	.698	.7834	.8157	-.0323	+.054	J	.775	.9407	.8004	+.1403	+.082
F	.695	.7770	.8175	-.0405	-.024	F	1.028	.9729	.7959	+.1770	-.015
M	.933	.7727	.8194	-.0467	+.038	M	1.068	1.0047	.7912	+.2135	+.055
A	.988	.7718	.8209	-.0491	+.074	A	1.328	1.0304	.7861	+.2443	+.112
M	.811	.7736	.8223	-.0487	-.071	M	.866	1.0474	.7895	+.2669	-.031
J	.632	.7794	.8234	-.0440	-.088	J	.818	1.0526	.7747	+.2779	-.152
J	.710	.7906	.8244	-.0338	-.092	J	.760	1.0435	.7683	+.2752	-.180
A	.711	.8071	.8252	-.0181	-.137	A	.839	1.0210	.7611	+.2599	-.173
S	.671	.8293	.8257	+.0036	+.017	S	1.788	.9875	.7534	+.2341	-.001
O	.896	.8582	.8260	+.0322	+.060	O	1.080	.9447	.7453	+.1994	+.093
N	1.195	.8924	.8262	+.0662	+.036	N	.912	.8949	.7370	+.1579	+.061
D	.921	.9292	.8260	+.1032	+.136	D	.701	.8406	.7284	+.1122	+.196
1869						1874					
J	1.022	.9664	.8256	+.1408	+.058	J	.651	.7829	.7194	+.0635	+.089
F	.855	1.0003	.8252	+.1751	-.026	F	.626	.7232	.7099	+.0133	-.010
M	.913	1.0266	.8246	+.2020	+.042	M	.543	.6637	.7004	-.0367	+.059
A	.900	1.0422	.8238	+.2184	+.088	A	.508	.6004	.6907	-.0843	+.110
M	.905	1.0463	.8230	+.2233	-.076	M	.576	.5540	.6805	-.1265	-.080
J	1.475	1.0379	.8219	+.2160	-.101	J	.558	.5988	.6705	-.1617	-.160
J	1.100	1.0172	.8211	+.1961	-.109	J	.628	.4741	.6604	-.1863	-.189
A	.957	.9870	.8203	+.1667	-.152	A	.566	.4499	.6502	-.2003	-.168
S	1.270	.9501	.8195	+.1306	+.021	S	.449	.4356	.6395	-.2039	-.018
O	.683	.9084	.8188	+.0896	+.068	O	.370	.4296	.6294	-.1998	+.098
N	.762	.8655	.8183	+.0472	+.034	N	.405	.4298	.6193	-.1895	+.072
D	.744	.8248	.8178	+.0070	+.157	D	.385	.4328	.6091	-.1763	+.195
1870						1875					
J	.729	.7881	.8175	-.0294	+.063	J	.344	.4371	.5988	-.1617	+.095
F	.766	.7579	.8176	-.0597	-.026	F	.405	.4419	.5892	-.1473	-.007
M	.667	.7361	.8177	-.0816	+.045	M	.533	.4472	.5794	-.1322	+.064
A	.652	.7231	.8181	-.0950	+.099	A	.441	.4544	.5699	-.1155	+.103
M	.738	.7182	.8187	-.1005	-.079	M	.517	.4647	.5608	-.0961	-.078
J	.737	.7197	.8197	-.1000	-.114	J	.535	.4788	.5522	-.0734	-.164
J	.830	.7251	.8207	-.0956	-.126	J	.595	.4944	.5437	-.0493	-.197
A	.837	.7310	.8218	-.0908	-.165	A	.497	.5106	.5357	-.0251	-.157
S	.719	.7339	.8229	-.0890	+.021	S	.404	.5249	.5280	-.0031	-.033
O	.645	.7315	.8241	-.0926	+.075	O	.421	.5351	.5211	+.0140	+.099
N	.706	.7230	.8256	-.1026	+.034	N	.521	.5396	.5146	+.0250	+.081
D	.883	.7088	.8269	-.1181	+.176	D	.525	.5400	.5086	+.0314	+.188
1871						1876					
J	.743	.6913	.8282	-.1369	+.069	J	.667	.5365	.5032	+.0333	+.099
F	.640	.6742	.8296	-.1534	-.024	F	.564	.5305	.4984	+.0321	-.004
M	.575	.6608	.8307	-.1699	+.048	M	.503	.5233	.4942	-.0291	+.071
A	.658	.6539	.8317	-.1778	+.108	A	.472	.5159	.4909	-.0250	+.095
M	.631	.6551	.8324	-.1773	-.081	M	.582	.5084	.4888	+.0196	-.077
J	.606	.6656	.8331	-.1675	-.129	J	.575	.5004	.4866	+.0138	-.167
J	.657	.6844	.8335	-.1491	-.145	J	.516	.4915	.4857	+.0058	-.202
A	.619	.7091	.8336	-.1245	-.172	A	.373	.4816	.4856	-.0040	-.143
S	.628	.7375	.8337	-.0962	+.019	S	.330	.4707	.4861	-.0154	-.042
O	1.010	.7670	.8334	-.0664	+.082	O	.377	.4600	.4873	-.0273	+.100
N	.764	.7937	.8328	-.0391	+.039	N	.496	.4512	.4891	-.0379	+.089
D	.822	.8165	.8322	-.0157	+.189	D	.522	.4459	.4916	-.0457	+.177

SHORT TERM INTEREST RATES

A225

TABLE 21—Continued

CALL MONEY RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1877						1882					
J	.633	.4461	.4945	-.0484	+.097	J	.705	.6229	.6644	-.0415	+.030
F	.522	.4529	.4979	-.0450	-.002	F	.677	.6212	.6572	-.0360	-.024
M	.390	.4666	.5019	-.0353	+.078	M	.587	.6245	.6491	-.0246	+.080
A	.481	.4866	.5068	-.0202	+.086	A	.574	.6314	.6402	-.0088	+.035
M	.465	.5116	.5121	-.0005	-.076	M	.536	.6409	.6308	+.0101	-.059
J	.408	.5400	.5178	+.0222	-.165	J	.656	.6521	.6204	+.0317	-.105
J	.448	.5697	.5237	+.0460	-.205	J	.641	.6654	.6098	+.0556	-.164
A	.660	.5988	.5296	+.0692	-.129	A	.649	.6806	.5985	+.0321	-.052
S	.678	.6258	.5355	+.0903	-.044	S	.861	.6969	.5871	+.1078	-.001
O	.685	.6490	.5418	+.1072	+.100	O	.672	.7121	.5747	+.1374	+.068
N	.635	.6663	.5482	+.1186	+.096	N	.804	.7236	.5623	+.1613	+.088
D	.613	.6776	.3544	+.1232	+.165	D	.851	.7280	.5498	+.1782	+.115
1878						1883					
J	.900	.6803	.5607	+.1196	+.089	J	.634	.7210	.5372	+.1838	+.019
F	.681	.6740	.5669	+.1071	-.004	F	.649	.7007	.5248	+.1759	-.044
M	.604	.6583	.5728	+.0855	+.084	M	.948	.6670	.5121	+.1549	+.068
A	.713	.6336	.5787	+.0549	+.078	A	.758	.6211	.4996	+.1215	+.024
M	.617	.6012	.5842	+.0170	-.073	M	.606	.5672	.4871	+.0801	-.056
J	.568	.5644	.5897	-.0253	-.160	J	.389	.5110	.4748	+.0362	-.088
J	.446	.5267	.5949	-.0682	-.203	J	.481	.4579	.4632	-.0053	-.153
A	.371	.4926	.5998	-.1072	-.113	A	.439	.4125	.4527	-.0402	-.041
S	.408	.4664	.6044	-.1380	-.044	S	.371	.3798	.4429	-.0631	+.016
O	.602	.4520	.6090	-.1570	+.097	O	.366	.3612	.4333	-.0721	+.065
N	.481	.4511	.6136	-.1625	+.100	N	.217	.3559	.4246	-.0687	+.084
D	.490	.4643	.6181	-.1538	+.151	D	.215	.3610	.4167	-.0557	+.113
1879						1884					
J	.407	.4902	.6227	-.1328	+.077	J	.274	.3741	.4092	-.0351	+.005
F	.492	.5261	.6273	-.1012	-.006	F	.318	.3902	.4027	-.0125	-.044
M	.566	.5692	.6317	-.0625	+.087	M	.191	.4044	.3968	+.0076	+.052
A	.575	.6158	.6363	-.0205	+.068	A	.307	.4141	.3916	+.0225	+.015
M	.651	.6625	.6408	+.0217	-.070	M	1.231	.4162	.3869	+.0293	-.055
J	.670	.7066	.6454	+.0612	-.150	J	.608	.4085	.3831	+.0254	-.071
J	.667	.7451	.6498	+.0953	-.197	J	.419	.3901	.3797	+.0104	-.140
A	.990	.7752	.6544	+.1208	-.095	A	.276	.3616	.3767	-.0151	-.033
S	.779	.7951	.6588	+.1363	-.039	S	.212	.3235	.3746	-.0511	+.031
O	.999	.8026	.6631	+.1395	+.092	O	.227	.2790	.3732	-.0942	+.063
N	.839	.7973	.6673	+.1300	+.102	N	.077	.2326	.3721	-.1395	+.081
D	.622	.7802	.6714	+.1088	+.141	D	.063	.1884	.3713	-.1829	+.113
1880						1885					
J	.639	.7533	.6753	+.0780	+.060	J	.077	.1507	.3709	-.2202	-.001
F	.677	.7200	.6791	+.0407	-.011	F	.212	.1235	.3711	-.2476	-.054
M	.774	.6848	.6826	+.0022	+.088	M	.033	.1098	.3717	-.2619	+.034
A	.759	.6526	.6859	-.0333	+.057	A	.125	.1090	.3729	-.2639	+.005
M	.675	.6268	.6887	-.0619	-.066	M	.212	.1199	.3746	-.2547	-.054
J	.614	.6101	.6915	-.0814	-.137	J	.134	.1403	.3767	-.2364	-.058
J	.584	.6037	.6938	-.0901	-.186	J	.260	.1669	.3792	-.2123	-.130
A	.476	.6069	.6959	-.0890	-.078	A	.204	.1961	.3817	-.1856	-.028
S	.462	.6173	.6973	-.0800	-.031	S	.145	.2263	.3844	-.1581	+.045
O	.375	.6345	.6991	-.0646	+.084	O	.265	.2569	.3876	-.1307	+.063
N	.683	.6552	.7002	-.0450	+.099	N	.350	.2874	.3912	-.1038	+.080
D	.919	.6773	.7010	-.0237	+.130	D	.323	.3190	.3951	-.0761	+.116
1881						1886					
J	.637	.6994	.7012	-.0018	+.045	J	.333	.3528	.3998	-.0470	-.005
F	1.220	.7198	.7012	+.0186	+.018	F	.380	.3885	.4043	-.0158	-.066
M	.789	.7360	.7006	+.0354	+.085	M	.407	.4254	.4094	+.0160	+.016
A	.600	.7460	.6995	+.0465	+.047	A	.379	.4633	.4149	+.0484	-.002
M	.592	.7484	.6979	+.0505	-.063	M	.513	.5013	.4209	+.0804	-.054
J	.619	.7425	.6956	+.0469	-.121	J	.576	.5380	.4269	+.1111	-.051
J	.712	.7283	.6931	+.0352	-.175	J	.471	.5731	.4334	+.1397	-.119
A	.731	.7084	.6901	+.0183	-.064	A	.750	.6071	.4403	+.1668	-.025
S	.739	.6856	.6863	-.0007	-.019	S	.713	.6391	.4473	+.1918	+.058
O	.661	.6632	.6820	-.0188	+.075	O	.639	.6687	.4547	+.2140	+.065
N	.622	.6439	.6771	-.0332	+.094	N	.671	.6956	.4620	+.2336	+.080
D	.637	.6303	.6713	-.0410	+.121	D	.821	.7192	.4697	+.2495	+.119

TABLE 21—Continued

CALL MONEY RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1887						1892					
J	.628	7381	.4777	+.2604	-.0006	J	.376	.3693	.5487	-.1794	+.004
F	.628	7524	.4856	+.2668	-.077	F	.385	.3476	.5391	-.1915	+.084
M	.701	7616	.4937	+.2679	-.002	M	.297	.3319	.5287	-.1968	+.04
A	.794	7654	.5017	+.2637	-.007	A	.305	.3245	.5178	-.1933	+.004
M	.765	7634	.5097	+.2577	-.007	M	.244	.3271	.5067	-.1796	+.068
J	.707	7359	.5177	+.2382	-.050	J	.233	.3413	.4947	-.1534	+.087
F	.788	7419	.5257	+.2162	-.111	F	.368	.3693	.4831	-.1138	+.094
J	.736	7205	.5336	+.1869	-.024	J	.350	.4112	.4517	-.0603	+.038
A	.642	.6913	.5411	+.1502	+.068	A	.325	.4661	.4597	+.0064	+.091
S	.554	.6545	.5488	+.1057	+.068	S	.009	.5382	.4485	+.0424	+.048
O	.581	.6104	.5599	+.0545	-.083	O	.630	.6013	.4367	+.1646	+.082
N	.578	.5612	.5627	-.0015	+.121	N	D	.736	.6707	+.2456	+.097
1888						1893					
J	.572	.5101	.5689	-.0588	-.005	J	.596	.7309	.4136	+.3173	+.006
F	.517	.4601	.5747	-.1146	-.086	F	.556	.7753	.4037	+.3726	+.079
M	.430	.4145	.5583	-.1058	-.046	M	.708	.7024	.3924	+.0717	+.04
A	.443	.3763	.5855	-.2092	-.010	A	.683	.7977	.3826	+.4151	+.005
M	.312	.3474	.5901	-.2427	-.057	M	.624	.7724	.3731	+.3993	+.068
J	.228	.3279	.5942	-.2663	-.052	J	1.048	.7259	.3642	+.3617	+.100
J	.263	.3177	.5975	-.2798	-.105	J	.985	.6618	.3559	+.3059	+.096
A	.214	.3166	.6003	-.2837	-.024	A	.789	.5849	.3479	+.2370	.049
S	.373	.3233	.6038	-.2795	-.083	S	.481	.5004	.3404	+.1600	+.093
O	.374	.3371	.6044	-.2673	+.072	O	.290	.4117	.3336	+.0781	+.087
N	.323	.3582	.6056	-.2474	+.085	N	.152	.3217	.3272	+.0055	+.078
D	.497	.3861	.6064	-.2203	+.119	D	-.031	.2341	.3216	+.0875	+.095
1889						1894					
J	.523	.4194	.6067	-.1873	-.004	J	-.001	.1528	.3164	-.1636	+.010
F	.453	.4572	.6067	-.1495	-.089	F	.075	.0812	.3119	-.2307	+.075
M	.495	.4766	.6063	-.1087	-.009	M	.012	.0233	.3077	-.2844	+.025
A	.601	.5374	.6056	-.0682	-.012	A	.037	-.0165	.3038	-.3203	+.016
M	.467	.5745	.6042	-.0297	-.060	M	.106	-.0367	.3003	-.3370	+.065
J	.535	.6079	.6033	+.0344	-.058	J	.113	-.0383	.2974	-.3337	+.113
J	.630	.6365	.6021	+.0446	-.100	J	.099	-.0238	.2946	-.3899	+.090
A	.614	.6006	.6014	+.0595	-.025	A	.061	.0018	.2920	-.2902	+.061
S	.600	.6821	.6002	+.0819	+.082	S	-.092	.0315	.2898	-.2583	+.092
O	.842	.7204	.5996	+.1028	+.077	O	-.088	.0600	.2877	-.2277	+.088
N	.765	.7215	.5991	+.1224	+.088	N	-.063	.0842	.2858	-.2016	+.076
D	.787	.7402	.5989	+.1413	+.116	D	.061	.1025	.2843	-.1818	+.

SHORT TERM INTEREST RATES

A227

TABLE 21—Continued

CALL MONEY RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1897						1902					
J	.227	.3712	.3280	+.0432	+.023	J	.602	.5914	.5721	+.0193	+.058
F	.292	.3213	.3341	-.0128	-.080	F	.495	.6003	.5667	+.0336	-.118
M	.176	.2758	.3409	-.0651	+.034	M	.577	.6154	.5609	+.0845	+.019
A	.131	.2377	.3479	-.1102	+.045	A	.676	.6351	.5550	+.0801	+.032
M	.198	.2095	.3550	-.1455	-.049	M	.792	.6583	.5490	+.1093	-.047
J	.219	.1928	.3614	-.1686	-.140	J	.602	.6824	.5429	+.1395	-.149
J	.189	.1886	.3680	-.1794	-.113	J	.683	.7043	.5365	+.1678	-.136
A	.202	.1969	.3744	-.1775	-.105	A	.760	.7208	.5305	+.1903	-.183
S	.263	.2155	.3808	-.1653	+.083	S	.991	.7300	.5243	+.2057	+.042
O	.313	.2404	.3862	-.1458	+.085	O	.811	.7298	.5185	+.2113	+.072
N	.170	.2673	.3916	-.1243	+.068	N	.536	.7204	.5127	+.2077	+.152
D	.331	.2920	.3967	-.1047	+.134	D	.564	.7032	.5071	+.1961	+.269
1898						1903					
J	.368	.3108	.4014	-.0906	+.030	J	.694	.6795	.5020	+.1775	+.066
F	.340	.3218	.4054	-.0836	-.090	F	.576	.6521	.4970	+.1551	-.117
M	.302	.3254	.4094	-.0840	+.034	M	.765	.6238	.4925	+.1313	+.013
A	.422	.3230	.4129	-.0899	+.051	A	.601	.5959	.4886	+.1073	+.021
M	.334	.3170	.4160	-.0990	-.044	M	.442	.5688	.4850	+.0838	-.055
J	.242	.3106	.4189	-.1083	.145	J	.630	.5431	.4819	+.0612	-.146
J	.215	.3062	.4216	-.1154	-.118	J	.536	.5179	.4793	+.0386	-.138
A	.355	.3057	.4241	-.1184	-.125	A	.495	.4918	.4772	+.0146	-.187
S	.501	.3112	.4269	-.1157	+.076	S	.336	.4639	.4756	-.0117	+.029
O	.268	.3242	.4294	-.1052	+.084	O	.362	.4334	.4743	-.0409	+.068
N	.223	.3455	.4322	-.0867	+.099	N	.552	.3999	.4737	-.0738	+.163
D	.221	.3756	.4352	-.0596	+.161	D	.451	.3637	.4739	-.1102	+.289
1899						1904					
J	.398	.4144	.4384	-.0240	+.037	J	.296	.3263	.4748	-.1485	+.073
F	.494	.4611	.4422	-.0189	-.101	F	.368	.2896	.4760	-.1864	-.110
M	.582	.5137	.4459	+.0678	+.031	M	.234	.2553	.4777	-.2224	+.009
A	.656	.5689	.4500	+.1189	+.054	A	.131	.2261	.4796	-.2535	+.009
M	.589	.6229	.4543	+.1686	-.042	M	.256	.2042	.4822	-.2780	-.066
J	.567	.6709	.4595	+.2114	-.147	J	.194	.1901	.4853	-.2952	-.141
J	.773	.7085	.4648	+.2437	-.123	J	.151	.1849	.4886	-.3037	-.138
A	.659	.7323	.4704	+.2619	-.144	A	.142	.1887	.4924	-.3037	-.188
S	.736	.7401	.4765	+.2636	+.069	S	.167	.2003	.4965	-.2962	+.018
O	.793	.7309	.4830	+.2479	+.082	O	.243	.2189	.5009	-.2820	+.065
N	.770	.7063	.4898	+.2165	+.111	N	.279	.2440	.5057	-.2617	+.168
D	.859	.6687	.4971	+.1716	+.188	D	.194	.2745	.5105	-.2360	+.302
1900						1905					
J	.573	.6207	.5048	+.1159	+.045	J	.272	.3095	.5153	-.2058	+.080
F	.464	.5664	.5121	+.0543	-.112	F	.440	.3486	.5203	-.1717	-.100
M	.568	.5101	.5200	-.0099	+.028	M	.501	.3912	.5253	-.1341	+.004
A	.435	.4561	.5279	-.0718	+.051	A	.513	.4360	.5304	-.0944	-.001
M	.342	.4082	.5359	-.1277	-.041	M	.460	.4818	.5356	-.0538	-.076
J	.376	.3706	.5436	-.1730	-.148	J	.534	.5276	.5407	-.0131	-.136
J	.313	.3462	.5509	-.2047	-.128	J	.501	.5713	.5456	+.0257	-.137
A	.275	.3368	.5580	-.2212	-.161	A	.497	.6115	.5502	+.0613	-.185
S	.146	.3431	.5649	-.2218	+.061	S	.544	.6477	.5549	+.0928	+.007
O	.473	.3644	.5709	-.2065	+.080	O	.660	.6795	.5593	+.1202	+.065
N	.580	.3974	.5766	-.1792	+.124	N	.715	.7064	.5635	+.1429	+.171
D	.494	.4384	.5817	+.1433	+.216	D	.911	.7300	.5676	+.1624	+.306
1901						1906					
J	.435	.4830	.5859	-.1029	+.052	J	.852	.7512	.5715	+.1797	+.085
F	.418	.5258	.5891	-.0633	-.117	F	.753	.7697	.5751	+.1946	-.087
M	.346	.5623	.5917	-.0294	+.023	M	.690	.7850	.5785	+.2065	-.002
A	.590	.5904	.5935	-.0031	+.043	A	.992	.7962	.5816	+.2146	-.014
M	.881	.6088	.5944	+.0144	-.043	M	.703	.8015	.5844	+.2171	-.085
J	.783	.6174	.5941	+.0233	-.149	J	.642	.7987	.5869	+.2118	-.130
J	.766	.6181	.5930	+.0251	-.133	J	.605	.7877	.5892	+.1985	-.132
A	.561	.6134	.5912	+.0222	-.174	A	.827	.7691	.5910	+.1781	-.180
S	.585	.6055	.5888	+.0167	+.052	S	.971	.7449	.5927	+.1522	+.001
O	.473	.5972	.5853	+.0119	+.077	O	.647	.7192	.5938	+.1254	+.065
N	.482	.5911	.5816	+.0095	+.140	N	.703	.6967	.5948	+.1019	+.172
D	.552	.5886	.5771	+.0115	+.244	D	.842	.6804	.5954	+.0850	+.304

TABLE 21—Continued

CALL MONEY RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1907						1912					
J	.703	.6724	.5954	+.0770	+.086	J	.362	.3967	.4766	-.0799	+.022
F	.715	.6742	.5952	+.0790	-.074	F	.418	.4143	.4799	-.0656	-.060
M	.815	.6842	.5942	+.0905	-.070	M	.429	.4378	.4828	-.0450	-.045
A	.395	.6988	.5926	+.1062	-.024	A	.521	.4658	.4853	-.0195	-.040
M	.453	.7133	.5904	+.1249	-.089	M	.500	.4963	.4871	+.0092	-.061
J	.619	.7308	.5874	+.1434	-.123	J	.509	.5270	.4884	+.0386	-.070
J	.784	.7416	.5838	+.1578	-.126	J	.524	.5552	.4890	+.0662	-.065
A	.655	.7452	.5798	+.1654	-.169	A	.533	.5788	.4890	+.0398	-.080
S	.605	.7407	.5755	+.1652	-.003	S	.654	.5961	.4882	+.1079	+.012
O	1.256	.7257	.5699	+.1558	+.066	O	.654	.6064	.4873	+.1191	+.073
N	.917	.6986	.5639	+.1347	+.171	N	.685	.6101	.4856	+.1245	+.120
D	.868	.6591	.5572	+.1019	+.296	D	.626	.6076	.4837	+.1239	+.187
1908						1913					
J	.596	.6072	.5495	+.0577	+.081	J	.476	.6000	.4810	+.1190	+.003
F	.324	.5429	.5416	+.0013	-.066	F	.579	.5882	.4787	+.1095	-.059
M	.286	.4694	.5329	-.0635	-.019	M	.669	.5727	.4757	+.0970	-.047
A	.269	.3919	.5239	-.1320	-.033	A	.576	.5529	.4724	+.0805	-.041
M	.311	.3153	.5145	-.1992	-.091	M	.490	.5292	.4688	+.0604	-.051
J	.296	.2458	.5051	-.2593	-.114	J	.415	.5017	.4654	+.0363	-.057
J	.201	.1895	.4951	-.3056	-.115	J	.395	.4711	.4618	+.0093	-.049
A	.178	.1509	.4835	-.3344	-.153	A	.415	.4401	.4583	-.0182	-.063
S	.134	.1310	.4758	-.3448	-.094	S	.442	.4118	.4547	-.0429	+.019
O	.089	.1298	.4659	-.3361	+.069	O	.487	.3892	.4511	-.0619	+.071
N	.079	.1449	.4565	-.3116	+.164	N	.467	.3753	.4475	-.0722	+.107
D	.185	.1719	.4476	-.2757	+.277	D	.504	.3720	.4439	-.0719	+.157
1909						1914					
J	.185	.2065	.4395	-.2330	+.073	J	.425	.3793	.4402	-.0609	-.015
F	.414	.2453	.4317	-.1864	-.062	F	.304	.3953	.4367	-.0414	-.054
M	.294	.2850	.4242	-.1392	-.027	M	.327	.4175	.4331	-.0156	-.048
A	.325	.3236	.4176	-.0940	-.037	A	.301	.4430	.4295	+.0135	-.041
M	.352	.3609	.4114	-.0505	-.087	M	.292	.4686	.4258	+.0428	-.042
J	.376	.3964	.4059	-.0095	-.104	J	.310	.4918	.4224	+.0694	-.043
J	.419	.4296	.4014	+.0282	-.105	J	.470	.5115	.4189	+.0926	-.032
A	.470	.4602	.3977	+.0625	-.134	A	.847	.5264	.4157	+.1107	-.051
S	.434	.4876	.3946	+.0930	-.094	S	.757	.5354	.4123	+.1231	+.021
O	.561	.5105	.3922	+.1183	+.073	O	.714	.5377	.4092	+.1285	+.064
N	.512	.5278	.3904	+.1374	+.155	N	.640	.5317	.4061	+.1256	+.093
D	.443	.5387	.3894	+.1493	+.259	D	.396	.5157	.4031	+.1126	+.133
1910						1915					
J	.617	.5428	.3889	+.1539	+.057	J	.354	.4894	.4002	+.0892	-.026
F	.503	.5397	.3890	+.1507	-.059	F	.342	.4532	.3977	+.0555	-.048
M	.494	.5301	.3896	+.1405	-.035	M	.332	.4091	.3954	+.0137	-.046
A	.555	.5148	.3906	+.1242	-.039	A	.360	.3610	.3934	+.0324	-.040
M	.639	.4951	.3921	+.1030	-.079	M	.324	.3139	.3915	-.0776	-.036
J	.535	.4731	.3941	+.0790	-.093	J	.292	.2727	.3903	-.1176	-.030
J	.475	.4512	.3964	+.0548	-.093	J	.283	.2416	.3892	-.1476	-.016
A	.306	.4308	.3991	+.0317	-.161	A	.286	.2230	.3886	-.1656	-.040
S	.301	.4140	.4021	+.0119	-.000	S	.231	.2178	.3884	-.1706	+.022
O	.421	.4018	.4056	-.0038	+.075	O	.206	.2244	.3887	-.1643	+.054
N	.363	.3944	.4094	-.0150	+.146	N	.196	.2403	.3896	-.1493	+.078
D	.292	.3912	.4134	-.0222	+.237	D	.175	.2624	.3912	-.1288	+.111
1911						1916					
J	.462	.3916	.4179	-.0263	+.040	J	.310	.2877	.3936	-.1059	-.036
F	.419	.3939	.4225	-.0286	-.061	F	.312	.3132	.3965	-.0833	-.038
M	.399	.3967	.4275	-.0308	-.041	M	.321	.3376	.4001	-.0625	-.042
A	.402	.3988	.4325	-.0337	-.040	A	.360	.3600	.4042	-.0442	-.038
M	.433	.3992	.4379	-.0387	-.069	M	.388	.3796	.4088	-.0292	-.030
J	.462	.3973	.4431	-.0458	-.082	J	.492	.3963	.4144	-.0181	-.019
J	.452	.3934	.4483	-.0549	-.079	J	.500	.4102	.4203	-.0101	-.004
A	.461	.3883	.4535	-.0652	-.097	A	.402	.4212	.4270	-.0058	-.035
S	.353	.3834	.4598	-.0754	+.005	S	.422	.4293	.4348	-.0055	+.022
O	.292	.3801	.4637	-.0836	+.075	O	.376	.4351	.4427	-.0076	+.044
N	.302	.3803	.4685	-.0882	+.153	N	.418	.4395	.4514	-.0119	+.065
D	.393	.3856	.4727	-.0871	+.212	D	.558	.4434	.4606	-.0172	+.089

SHORT TERM INTEREST RATES

A229

TABLE 21—Continued

CALL MONEY RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1917						1922					
J	.350	.4477	.4709	-.0232	-.038	J	.673	.6561	.7355	-.0794	-.015
F	.409	.4539	.4816	-.0277	-.027	F	.661	.6402	.7273	-.0871	+.029
M	.393	.4626	.4925	-.0299	-.035	M	.627	.6273	.7192	-.0919	-.001
A	.428	.4742	.5038	-.0296	-.035	A	.617	.6178	.7109	-.0931	-.018
M	.513	.4892	.5152	-.0260	-.026	M	.598	.6118	.7028	-.0910	-.006
J	.686	.5076	.5277	-.0201	-.014	J	.597	.6093	.6948	-.0855	-.029
J	.525	.5285	.5402	-.0117	.000	J	.602	.6103	.6868	-.0765	-.015
A	.506	.5517	.5529	-.0012	-.030	A	.593	.6145	.6789	-.0644	-.018
S	.636	.5762	.5650	+ .0112	+ .020	S	.636	.6214	.6711	-.0497	+.001
O	.567	.6009	.5784	+ .0225	+ .035	O	.662	.6305	.6637	-.0332	+.013
N	.567	.6249	.5917	+ .0332	+ .033	N	.680	.6411	.6563	-.0152	+.009
D	.636	.6474	.6048	+ .0426	+ .077	D	.626	.6526	.6493	+ .0033	+ .042
1918						1923					
J	.651	.6678	.6176	+ .0502	-.038	J	.646	.6641	.6423	+ .0218	-.011
F	.714	.6856	.6312	+ .0544	-.016	F	.650	.6753	.6359	+ .0394	+.033
M	.744	.7006	.6444	+ .0562	-.028	M	.710	.6860	.6295	+ .0565	+.001
A	.659	.7129	.6578	+ .0551	-.034	A	.702	.6958	.6236	+ .0222	-.014
M	.724	.7224	.6704	-.022	.022	M	.675	.7045	.6177	+ .0868	-.003
J	.709	.7291	.6838	+ .0453	-.010	J	.729	.7116	.6124	+ .0992	-.030
J	.749	.7333	.6964	+ .0369	+ .002	J	.726	.7162	.6072	+ .1090	-.022
A	.794	.7350	.7086	+ .0264	-.025	A	.714	.7171	.6026	+ .1145	-.018
S	.763	.7343	.7199	+ .0144	+ .015	S	.691	.7128	.5981	+ .1147	-.002
O	.750	.7318	.7309	+ .0009	+ .028	O	.666	.7019	.5941	+ .1078	+.015
N	.724	.7284	.7420	-.0136	+ .013	N	.677	.6835	.5903	+ .0932	+.002
D	.668	.7249	.7525	-.0276	+ .064	D	.646	.6576	.5869	+ .0707	+ .041
1919						1924					
J	.714	.7230	.7624	-.0394	-.035	J	.651	.6251	.5835	+ .0416	-.009
F	.708	.7239	.7712	-.0473	-.004	F	.604	.5876	.5806	+ .0070	+.032
M	.707	.7288	.7797	-.0511	-.019	M	.604	.5477	.5780	-.0303	+.002
A	.764	.7387	.7879	-.0490	-.032	A	.633	.5082	.5756	-.0674	-.009
M	.741	.7534	.7950	-.0416	-.021	M	.525	.4719	.5736	-.1017	-.001
J	.830	.7727	.8012	-.0285	-.008	J	.380	.4410	.5718	-.1308	-.028
J	.815	.7956	.8068	-.0112	+ .001	J	.350	.4175	.5704	-.1529	-.028
A	.731	.8204	.8120	+ .0084	-.021	A	.319	.4027	.5690	-.1663	-.018
S	.752	.8453	.8167	+ .0286	+ .010	S	.313	.3972	.5678	-.1706	+.003
O	.879	.8689	.8203	+ .0486	+ .021	O	.355	.4015	.5670	-.1655	+.010
N	1.011	.8893	.8236	+ .0657	+ .033	N	.381	.4151	.5666	-.1515	+.003
D	.894	.9055	.8264	+ .0791	+ .053	D	.501	.4374	.5662	-.1288	+ .042
1920						1925					
J	.942	.9167	.8285	+ .0882	-.029	J	.529	.4667	.5660	-.0993	-.008
F	.993	.9227	.8304	+ .0923	+ .007	F	.531	.5010	.5663	-.0653	+.025
M	.919	.9237	.8315	+ .0922	-.011	M	.597	.5375	.5669	-.0294	+.002
A	.892	.9205	.8319	+ .0886	-.029	A	.592	.5731	.5678	+ .0053	-.005
M	.870	.9140	.8319	+ .0821	-.016	M	.581	.6049	.5688	+ .0361	+.001
J	.889	.9051	.8311	+ .0740	-.014	J	.620	.6309	.5703	+ .0606	-.021
J	.919	.8951	.8301	+ .0650	.009	J	.638	.6496	.5723	+ .0773	-.026
A	.879	.8850	.8289	+ .0561	-.020	A	.640	.6610	.5746	+ .0864	-.018
S	.846	.8755	.8273	+ .0480	+ .005	S	.662	.6660	.5773	+ .0887	+.003
O	.872	.8668	.8249	+ .0419	+ .017	O	.663	.6663	.5804	+ .0859	+.006
N	.873	.8589	.8220	+ .0369	-.025	N	.674	.6639	.5840	+ .0799	+.002
D	.800	.8516	.8186	+ .0330	+ .045	D	.684	.6604	.5881	+ .0723	+ .042
1921						1926					
J	.848	.8444	.8149	+ .0295	-.021	J	.645	.6570	.5926	+ .0644	-.009
F	.843	.8366	.8106	+ .0260	+ .018	F	.671	.6543	.5976	+ .0567	+.015
M	.839	.8276	.8037	+ .0219	-.005	M	.657	.6524	.6029	+ .0495	+.001
A	.836	.8170	.8001	+ .0169	-.026	A	.611	.6512	.6088	+ .0424	-.002
M	.842	.8044	.7943	+ .0101	-.010	M	.580	.6505	.6150	+ .0355	+.001
J	.798	.7898	.7878	+ .0020	-.020	J	.631	.6502	.6219	+ .0283	-.013
J	.754	.7732	.7811	-.0079	.006	J	.647	.6502	.6288	+ .0214	-.017
A	.765	.7548	.7741	-.0193	-.019	A	.674	.6508	.6360	+ .0148	-.019
S	.710	.7350	.7669	-.0319	+ .001	S	.699	.6517	.6435	+ .0082	+.002
O	.708	.7146	.7591	-.0445	+ .015	O	.673	.6526	.6515	+ .0011	+.004
N	.687	.6941	.7513	-.0572	+ .015	N	.657	.6531	.6594	-.0063	+.002
D	.669	.6743	.7433	-.0690	+ .042	D	.672	.6522	.6676	-.0154	+ .041

TABLE 21—Concluded

CALL MONEY RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1927						1932					
F	.645	.6491	.6754	-.0263	-.010	J	.433	.3914			-.010
M	.602	.6434	.6838	-.0404	+.003	F	.408	.4036			-.010
A	.616	.6352	.6914	-.0562	.000	M	.398	.4039			.000
M	.622	.6247	.6990	-.0743	-.001	A	.398	.3929			.000
J	.629	.6131	.7063	-.0932	.000	M	.398	.3720			.000
J	.639	.6020	.7131	-.1111	-.003	J	.398	.3432			.000
A	.617	.5930	.7195	-.1265	-.010	A	.318	.3099			.000
S	.586	.5873	.7264	-.1391	-.020	S	.321	.2746			-.020
O	.579	.5862	.7310	-.1448	+.001	O	.301	.2392			.000
N	.589	.5905	.7357	-.1452	+.002	N	.130	.2045			.000
D	.555	.5999	.7396	-.1397	+.001	D	.000	.1719			.000
	.600	.6143	.7428	-.1285	+.041		-.040	.1414			+.040
1928						1933					
J	.637	.6380	.7456	-.1126	-.010	J	.010	.1126			-.010
F	.647	.6350	.7474	-.0924	-.006	F	.010	.0864			-.010
M	.650	.6791	.7486	-.0695	.000	M	.521	.0631			.000
A	.706	.7048	.7489	-.0441	.000	A	.137	.0422			.000
M	.756	.7311	.7484	-.0173	.000	M	.000	.0242			.000
J	.801	.7573	.7470	+.0103	.000	J	.000	.0089			.000
J	.785	.7832	.7451	+.0381	-.003	J	.000	-.0047			.000
A	.857	.8085	.7427	+.0658	-.020	A	.011	-.0174			-.020
S	.861	.8127	.7397	+.0931	.000	S	-.125	-.0291			.000
O	.844	.8355	.7357	+.1198	.000	O	-.125	-.0400			.000
N	.824	.8766	.7312	+.1454	.000	N	-.125	-.0494			.000
D	.895	.8953	.7264	+.1689	+.040	D	-.067	-.0555			+.040
1929						1934					
J	.858	.9110	.7210	+.1900	-.010	J	.010	-.0560			-.010
F	.859	.9231	.7148	+.2083	-.010	F	.010	-.0497			-.010
M	.959	.9312	.7083	+.2229	.000	M	.000	-.0359			.000
A	.949	.9344	.7012	+.2332	.000	A	.000	-.0152			.000
M	.950	.9321	.6940	+.2381	.000	M	.000	.000			.000
J	.886	.9239			.000	J	.000	.000			.000
J	.965	.9091			.000	J	.000	.000			.000
A	.935	.8870			-.020	A	.020	.000			-.020
S	.929	.8580			.000	S	.000	.000			.000
O	.808	.8222			.000	O	.000	.000			.000
N	.736	.7801			.000	N	.000	.000			.000
D	.644	.7332			+.040	D	-.040	.000			+.040
1930						1935					
J	.677	.6833			-.010	J	.010	.000			-.010
F	.645	.6321			-.010	F	.010	.000			-.010
M	.567	.5813			.000	M	.000	.000			.000
A	.602	.5326			.000	A	.000	.194			.000
M	.494	.4868			.000	M	-.602	.000			.000
J	.418	.4439			.000	J	-.602	.000			.000
J	.342	.4037			.000	J	-.602	.000			.000
A	.364	.3659			-.020	A	-.582	.000			-.020
S	.340	.3299			.000	S	-.602	.000			.000
O	.301	.2956			.000	O	-.538	.000			.000
N	.301	.2637			.000	N	-.125	.000			.000
D	.308	.2351			+.040	D	-.165	.000			+.040
1931						1936					
J	.206	.2108			-.010	J	-.115	.000			-.010
F	.186	.1921			-.010			.000			.000
M	.190	.1803			.000			.000			.000
A	.182	.1760			.000			.000			.000
M	.161	.1795			.000			.000			.000
J	.176	.1916			.000			.000			.000
J	.176	.2116			.000			.000			.000
A	.196	.2383			-.020			.000			.000
S	.176	.2703			.000			.000			.000
O	.322	.3053			.000			.000			.000
N	.398	.3393			.000			.000			.000
D	.391	.3690			+.040			.000			.000

TABLE 22

90-DAY TIME MONEY RATES IN NEW YORK CITY

MONTHLY AVERAGES, JANUARY 1890-JANUARY 1936

- Col. 1. Logarithms of Data Adjusted for Seasonal Fluctuations.
- Col. 2. Cyclical Curve (logarithms).
- Col. 3. Trend Curve (logarithms).
- Col. 4. Deviations of Cyclical Curve
(logarithms) from Trend Curve
(logarithms).
- Col. 5. Changing Seasonal Fluctuations
(logarithms).

For details of the nature of the graduations given in Columns 2 and 3 and of the seasonal given in Column 5, see Appendix D.

TABLE 22

TIME MONEY RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1890						1895					
J	.699	.6989	.6888	+.0101	-.018	J	.423	.4014	.5005	-.0991	-.016
F	.742	.7105	.6889	+.0216	-.048	F	.526	.4086	.4993	-.0907	-.022
M	.717	.7212	.6890	+.0322	-.013	M	.504	.4149	.4981	-.0832	+.025
A	.683	.7305	.6893	+.0412	-.030	A	.520	.4209	.4969	-.0760	+.013
M	.757	.7378	.6895	+.0483	-.041	M	.416	.4274	.4958	-.0684	-.036
J	.741	.7427	.6899	+.0528	-.042	J	.356	.4344	.4949	-.0605	-.055
J	.716	.7451	.6904	+.0547	-.030	J	.432	.4417	.4940	-.0523	-.054
A	.756	.7456	.6907	+.0549	+.022	A	.374	.4501	.4932	-.0431	+.024
S	.737	.7446	.6911	+.0535	+.059	S	.356	.4610	.4926	-.0316	+.074
O	.730	.7428	.6914	+.0514	+.048	O	.401	.4758	.4918	-.0160	+.054
N	.794	.7410	.6916	+.0494	+.051	N	.404	.4960	.4913	+.0047	-.006
D	.803	.7394	.6916	+.0478	+.042	D	.618	.5226	.4910	+.0316	-.003
1891						1896					
J	.740	.7383	.6913	+.0470	-.022	J	.792	.5553	.4908	+.0645	-.014
F	.697	.7376	.6911	+.0465	-.046	F	.744	.5917	.4907	+.0101	-.024
M	.685	.7365	.6904	+.0461	-.008	M	.561	.6287	.4908	+.0379	+.028
A	.645	.7344	.6895	+.0449	-.022	A	.551	.6623	.4909	+.0174	+.017
M	.791	.7302	.6878	+.0424	-.044	M	.527	.6879	.4911	+.0196	-.033
J	.696	.7230	.6862	+.0368	-.043	J	.555	.7030	.4918	+.0212	-.061
J	.687	.7120	.6839	+.0281	-.029	J	.650	.7063	.4926	+.0237	-.059
J	.720	.6969	.6815	+.0154	+.025	A	.853	.6975	.4937	+.0038	+.020
S	.699	.6776	.6787	-.0011	+.063	S	.823	.6780	.4948	+.0132	+.074
O	.682	.6550	.6754	-.0204	+.050	O	.872	.6503	.4964	+.0139	+.054
N	.670	.6300	.6719	-.0419	+.029	N	.678	.6166	.4981	+.0185	+.004
D	.615	.6038	.6681	-.0643	+.028	D	.492	.5785	.5002	+.0783	-.001
1892						1897					
J	.542	.5779	.6635	-.0856	-.022	J	.429	.5384	.5024	+.0360	-.011
F	.533	.5538	.6592	-.1054	-.039	F	.428	.4985	.5048	-.0063	-.030
M	.549	.5531	.6543	-.1212	+.001	M	.424	.4610	.5075	-.0465	+.028
A	.471	.5171	.6490	-.1319	-.012	A	.381	.4289	.5103	-.0514	+.017
M	.461	.5079	.6431	-.1352	-.043	M	.429	.4052	.5132	-.1030	-.031
J	.475	.5069	.6375	-.1306	-.044	J	.413	.3922	.5164	-.1242	-.067
J	.507	.5155	.6316	-.1161	-.030	J	.361	.3910	.5194	-.1284	-.060
J	.443	.5345	.6257	-.0912	+.027	A	.416	.4019	.5223	-.1204	+.014
S	.586	.5638	.6197	-.0559	+.067	S	.432	.4227	.5249	-.1022	+.073
O	.689	.6016	.6135	-.0119	+.051	O	.449	.4496	.5278	-.0782	+.055
N	.721	.6452	.6075	+.0377	+.010	N	.460	.4787	.5302	-.0515	+.017
D	.726	.6912	.6015	+.0897	+.014	D	.527	.5060	.5326	-.0266	+.004
1893						1898					
J	.709	.7348	.5957	+.1391	-.021	J	.468	.5279	.5348	-.0069	-.009
F	.646	.7716	.5899	+.1817	-.03	F	.467	.5423	.5367	+.0056	-.037
M	.760	.7985	.5841	+.2144	+.011	M	.637	.5493	.5385	+.0108	+.026
A	.773	.8129	.5785	+.2344	-.002	A	.750	.5491	.5401	+.0090	+.014
M	.810	.8136	.5728	+.2408	-.042	M	.601	.5431	.5414	+.0017	-.030
J	.831	.8012	.5675	+.2337	-.047	J	.518	.5330	.5427	-.0097	-.074
J	.977	.7769	.5621	+.2148	-.035	J	.467	.5200	.5438	-.0238	-.059
A	.841	.7422	.5569	+.1853	+.028	A	.463	.5054	.5446	-.0392	+.007
S	.690	.6991	.5517	+.1474	+.070	S	.497	.4911	.5452	-.0541	+.070
O	.636	.6495	.5469	+.1026	+.052	O	.375	.4789	.5459	-.0670	+.055
N	.533	.5952	.5422	+.0530	-.002	N	.428	.4707	.5468	-.0761	+.034
D	.413	.5384	.5378	+.0006	+.005	D	.462	.4688	.5477	-.0789	+.015
1894						1899					
J	.437	.4824	.5333	-.0509	-.020	J	.468	.4749	.5489	-.0740	-.007
F	.433	.4301	.5293	-.0992	-.025	F	.523	.4894	.5499	-.0605	-.042
M	.379	.3849	.5255	-.1406	+.019	M	.580	.5118	.5514	-.0396	+.022
A	.392	.3502	.5218	-.1716	+.006	A	.583	.5404	.5531	-.0127	+.006
M	.340	.3280	.5185	-.1905	-.039	M	.535	.5723	.5552	+.0171	-.031
J	.325	.3185	.5153	-.1968	-.051	J	.558	.6041	.5575	+.0466	-.081
J	.346	.3207	.5125	-.1918	-.045	J	.612	.6325	.5602	+.0723	-.053
J	.362	.3317	.5100	-.1783	+.027	A	.633	.6550	.5630	+.0920	.000
S	.305	.3475	.5077	-.1602	+.072	S	.679	.6700	.5662	+.1038	+.066
O	.248	.3644	.5054	-.1410	+.053	O	.672	.6773	.5699	+.1074	+.056
N	.386	.3799	.5036	-.1237	+.008	N	.727	.6776	.5738	+.1038	+.048
D	.378	.3923	.5019	-.1096	-.001	D	.758	.6721	.5779	+.0942	+.029

SHORT TERM INTEREST RATES

A233

TABLE 22—Continued

TIME MONEY RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1900						1905					
J	.686	.6621	.5823	+.0798	-.005	J	.463	.4823	.6236	-.1413	+.004
F	.672	.6490	.5870	+.0620	-.044	F	.517	.4960	.6263	-.1303	-.026
M	.643	.6340	.5918	+.0422	+.016	M	.525	.5108	.6288	-.1180	-.014
A	.549	.6179	.5970	+.0209	-.005	A	.567	.5265	.6313	-.1048	-.040
M	.510	.6018	.6024	-.0006	-.033	M	.564	.5430	.6335	-.0905	-.062
J	.572	.5870	.6080	-.0210	-.086	J	.582	.5605	.6360	-.0755	-.095
J	.572	.5745	.6135	-.0390	-.046	J	.567	.5788	.6384	-.0596	-.077
A	.565	.5656	.6187	-.0531	-.007	A	.545	.5977	.6407	-.0430	-.029
S	.538	.5612	.6237	-.0625	+.061	S	.593	.6170	.6429	-.0259	+.038
O	.637	.5616	.6288	-.0672	+.057	O	.612	.6366	.6451	-.0085	+.078
N	.576	.5664	.6337	-.0673	+.060	N	.650	.6560	.6471	+.0039	+.107
D	.630	.5751	.6383	-.0632	+.049	D	.636	.6752	.6490	+.0262	+.122
1901						1906					
J	.587	.5861	.6424	-.0563	-.004	J	.699	.6940	.6507	+.0433	+.007
F	.555	.5978	.6465	-.0487	-.043	F	.746	.7120	.6526	+.0594	-.026
M	.505	.6086	.6501	-.0415	+.011	M	.737	.7287	.6541	+.0746	-.019
A	.632	.6179	.6532	-.0353	-.015	A	.796	.7434	.6555	+.0879	-.041
M	.677	.6246	.6555	-.0309	-.038	M	.761	.7551	.6567	+.0954	-.066
J	.642	.6290	.6577	-.0287	-.071	J	.736	.7630	.6580	+.1050	-.095
J	.681	.6314	.6595	-.0281	-.045	J	.735	.7662	.6592	+.1070	-.082
A	.655	.6326	.6607	-.0281	-.014	A	.760	.7650	.6601	+.1049	-.028
S	.649	.6331	.6615	-.0284	+.055	S	.822	.7600	.6610	+.0990	+.035
O	.609	.6342	.6622	-.0280	+.058	O	.703	.7526	.6618	+.0908	+.084
N	.598	.6364	.6622	-.0258	+.073	N	.747	.7452	.6625	+.0827	+.110
D	.646	.6402	.6617	-.0215	+.069	D	.772	.7400	.6630	+.0770	+.125
1902						1907					
J	.659	.6463	.6608	-.0145	-.003	J	.754	.7386	.6633	+.0753	+.008
F	.641	.6550	.6597	-.0047	-.039	F	.748	.7421	.6635	+.0786	-.038
M	.599	.6659	.6584	+.0075	+.003	M	.818	.7508	.6634	+.0874	-.024
A	.653	.6787	.6569	+.0218	-.025	A	.687	.7632	.6632	+.1000	-.042
M	.722	.6928	.6550	+.0378	-.045	M	.668	.7777	.6626	+.1151	-.069
J	.732	.7072	.6530	+.0542	-.074	J	.740	.7917	.6617	+.1300	-.093
J	.711	.7206	.6508	+.0678	-.048	J	.791	.8029	.6604	+.1425	-.083
A	.695	.7322	.6485	+.0837	-.021	A	.833	.8089	.6588	+.1501	-.026
S	.843	.7411	.6458	+.0753	+.051	S	.722	.8981	.6569	+.1512	+.035
O	.811	.7465	.6432	+.1033	+.051	O	.815	.7993	.6543	+.1450	+.091
N	.725	.7486	.6405	+.1081	+.054	N	1.020	.7819	.6516	+.1303	+.110
D	.745	.7478	.6376	+.1102	+.088	D	.876	.7553	.6484	+.1074	+.124
1903						1908					
J	.696	.7443	.6345	+.1098	.000	J	.721	.7220	.6446	+.0774	+.008
F	.697	.7390	.6316	+.1074	-.035	F	.656	.6813	.6407	+.0406	-.031
M	.755	.7328	.6287	+.1041	-.034	M	.533	.6354	.6361	-.0007	-.030
A	.728	.7260	.6258	+.1002	-.043	A	.497	.5869	.6311	-.0442	-.042
M	.643	.7183	.6230	+.0953	-.050	M	.535	.5387	.6257	-.0870	-.071
J	.726	.7099	.6203	+.0876	-.075	J	.454	.4936	.6201	-.1265	-.089
J	.716	.7000	.6179	+.0821	-.055	J	.439	.4544	.6142	-.1598	-.079
A	.716	.6880	.6156	+.0724	-.025	A	.430	.4235	.6081	-.1846	-.022
S	.674	.6733	.6138	+.0595	+.046	S	.375	.4021	.6020	-.1999	+.035
O	.634	.6554	.6118	+.0436	+.065	O	.395	.3906	.5958	-.2052	+.096
N	.671	.6342	.6106	+.0236	+.073	N	.411	.3883	.5897	-.2014	+.109
D	.616	.6100	.6096	+.0004	+.103	D	.387	.3936	.5834	-.1898	+.118
1904						1909					
J	.603	.5836	.6090	-.0254	+.002	J	.420	.4046	.5770	-.1724	+.005
F	.596	.5563	.6087	-.0524	-.029	F	.479	.4194	.5708	-.1514	-.035
M	.510	.5294	.6088	-.0794	-.039	M	.458	.4359	.5650	-.1291	-.035
A	.468	.5045	.6091	-.1046	-.038	A	.435	.4535	.5595	-.1060	-.042
M	.473	.4832	.6095	-.1263	-.056	M	.486	.4711	.5546	-.0835	-.071
J	.460	.4664	.6105	-.1441	-.076	J	.491	.4888	.5496	-.0608	-.084
J	.453	.4549	.6117	-.1568	-.066	J	.447	.5066	.5452	-.0386	-.070
A	.399	.4489	.6131	-.1642	-.028	A	.534	.5248	.5415	-.0167	-.017
S	.470	.4482	.6149	-.1667	+.042	S	.537	.5433	.5379	+.0054	+.036
O	.473	.4520	.6167	-.1647	+.071	O	.579	.5620	.5349	+.0271	+.098
N	.474	.4596	.6189	-.1593	+.100	N	.582	.5803	.5323	+.0480	+.105
D	.440	.4700	.6212	-.1512	+.115	D	.557	.5974	.5501	+.0673	+.110

TABLE 22—Continued

TIME MONEY RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1910						1915					
J	.634	.6123	.5283	+.0840	-.0000	J	.536	.5967	.5455	+.0512	-.0332
F	.605	.6240	.5272	+.0768	-.038	F	.485	.5715	.5437	+.0278	-.026
M	.630	.6317	.5263	+.1054	-.039	M	.490	.5404	.5419	-.0015	-.035
A	.630	.6349	.5258	+.1091	-.041	A	.488	.5064	.5405	-.0341	-.024
M	.665	.6331	.5256	+.1075	-.071	M	.491	.4732	.5392	-.0660	-.038
J	.608	.6269	.5261	+.1008	-.077	J	.445	.4442	.5380	-.0938	-.014
J	.653	.6171	.5269	+.0902	-.055	J	.450	.4225	.5371	-.1146	-.006
A	.588	.6044	.5280	+.0764	-.011	A	.434	.4096	.5365	-.1269	+.015
S	.588	.5900	.5292	+.0608	+.037	S	.396	.4057	.5362	-.1305	+.043
O	.581	.5750	.5313	+.0437	+.098	O	.392	.4094	.5363	-.1269	+.047
N	.553	.5602	.5334	+.0268	+.098	N	.402	.4187	.5365	-.1178	+.033
D	.494	.5460	.5359	+.0101	+.098	D	.404	.4311	.5370	-.1059	+.008
1911						1916					
J	.540	.5331	.5389	-.0058	-.011	J	.470	.4444	.5380	-.0936	-.031
F	.536	.5216	.5419	-.0203	-.039	F	.457	.4572	.5393	-.0821	-.016
M	.499	.5115	.5455	-.0340	-.043	M	.478	.4691	.5412	-.0721	-.028
A	.479	.5031	.5494	-.0463	-.040	A	.475	.4801	.5435	-.0634	-.016
M	.513	.4964	.5534	-.0570	-.069	M	.484	.4904	.5462	-.0558	-.025
J	.516	.4914	.5577	-.0663	-.067	J	.547	.5007	.5494	-.0487	-.003
J	.502	.4883	.5619	-.0736	-.043	J	.600	.5112	.5530	-.0418	-.001
A	.507	.4872	.5661	-.0789	-.002	A	.493	.5217	.5571	-.0354	+.016
S	.505	.4881	.5705	-.0824	+.039	S	.494	.5322	.5620	-.0298	+.027
O	.463	.4911	.5749	-.0838	+.096	O	.498	.5425	.5671	-.0246	+.028
N	.470	.4963	.5790	-.0827	+.089	N	.513	.5527	.5728	-.0201	+.021
D	.532	.5039	.5830	-.0791	+.083	D	.626	.5631	.5791	-.0160	+.002
1912						1917					
J	.491	.5136	.5868	-.0732	-.021	J	.525	.5741	.5857	-.0116	-.029
F	.499	.5257	.5905	-.0648	-.038	F	.616	.5862	.5927	-.0065	-.007
M	.581	.5399	.5938	-.0539	-.044	M	.595	.5997	.6003	-.0006	-.021
A	.582	.5560	.5966	-.0406	-.038	A	.608	.6148	.6082	+.0066	-.009
M	.569	.5735	.5989	-.0254	-.065	M	.659	.6315	.6162	+.0153	-.014
J	.549	.5920	.6007	-.0087	-.055	J	.687	.6495	.6249	+.0246	+.004
J	.587	.6106	.6022	+.0084	-.033	J	.634	.6681	.6338	+.0343	+.001
A	.608	.6295	.6034	+.0261	+.005	A	.637	.6868	.6426	+.0442	+.015
S	.699	.6464	.6043	+.0421	+.041	S	.724	.7048	.6516	+.0532	+.016
O	.666	.6616	.6044	+.0572	+.094	O	.732	.7215	.6610	+.0605	+.014
N	.692	.6750	.6042	+.0708	+.077	N	.722	.7364	.6702	+.0662	+.014
D	.706	.6862	.6036	+.0826	+.063	D	.749	.7493	.6799	+.0694	-.004
1913						1918					
J	.642	.6942	.6027	+.0915	-.028	J	.778	.7597	.6895	+.0702	-.026
F	.692	.7002	.6012	+.0990	-.036	F	.766	.7676	.6990	+.0686	-.002
M	.773	.7026	.5998	+.1028	-.043	M	.791	.7731	.7083	+.0648	-.013
A	.668	.7005	.5979	+.1026	-.035	A	.783	.7763	.7178	+.0585	-.005
M	.653	.6932	.5958	+.0974	-.058	M	.782	.7772	.7271	+.0501	-.004
J	.656	.6805	.5934	+.0871	-.040	J	.754	.7761	.7361	+.0400	-.008
J	.680	.6627	.5909	+.0718	-.023	J	.756	.7736	.7449	+.0287	+.001
A	.644	.6414	.5884	+.0530	+.009	A	.761	.7699	.7534	+.0165	-.011
S	.623	.6187	.5858	+.0329	+.042	S	.771	.7653	.7615	+.0038	-.007
O	.612	.5971	.5832	+.0139	+.090	O	.772	.7603	.7696	-.0093	+.006
N	.632	.5790	.5805	-.0015	+.062	N	.770	.7553	.7767	-.0214	+.008
D	.663	.5672	.5777	-.0105	+.039	D	.762	.7504	.7836	-.0332	-.008
1914						1919					
J	.597	.5611	.5746	-.0135	-.032	J	.735	.7462	.7902	-.0440	-.021
F	.514	.5611	.5718	-.0107	-.033	F	.723	.7431	.7959	-.0528	+.002
M	.516	.5663	.5691	-.0028	-.039	M	.747	.7416	.8015	-.0599	-.007
A	.478	.5753	.5664	+.0089	-.029	A	.764	.7421	.8064	-.0646	-.001
M	.435	.5858	.5638	+.0220	-.048	M	.738	.7453	.8112	-.0659	+.002
J	.433	.5977	.5613	+.0364	-.028	J	.753	.7514	.8150	-.0636	+.009
J	.577	.6091	.5588	+.0503	-.014	J	.778	.7607	.8186	-.0579	.000
A	.871	.6188	.5564	+.0624	+.012	A	.767	.7731	.8218	-.0487	+.007
S	.797	.6256	.5539	+.0717	+.042	S	.770	.7883	.8239	-.0356	-.001
O	.734	.6282	.5516	+.0766	+.079	O	.789	.8057	.8260	-.0203	+.002
N	.671	.6251	.5494	+.0757	+.047	N	.809	.8245	.8277	-.0032	+.004
D	.568	.6148	.5473	+.0675	+.020	D	.828	.8438	.8288	+.0150	-.008

SHORT TERM INTEREST RATES

A235

TABLE 22—Continued

TIME MONEY RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1920						1925					
J	.881	.8626	.8293	+.0333	-.017	J	.549	.5198	.6018	-.0820	+.010
F	.904	.8799	.8298	+.0501	+.006	F	.552	.5380	.6014	-.0634	+.010
M	.911	.8946	.8297	+.0649	-.000	M	.590	.5591	.6012	-.0421	+.020
A	.906	.9063	.8293	+.0770	+.004	A	.594	.5813	.6013	-.0200	+.009
M	.911	.9142	.8285	+.0857	+.005	M	.576	.6026	.6016	+.0010	+.001
J	.902	.9183	.8273	+.0910	+.006	J	.609	.6215	.6022	+.0193	-.024
J	.921	.9184	.8259	+.0925	-.003	J	.621	.6369	.6031	+.0338	-.027
A	.940	.9150	.8243	+.0907	+.001	A	.652	.6481	.6045	+.0436	-.014
S	.919	.9084	.8224	+.0860	-.004	S	.644	.6555	.6061	+.0494	.000
O	.901	.8993	.8202	+.0791	-.001	O	.677	.6597	.6083	+.0514	+.006
N	.889	.8882	.8177	+.0705	+.001	N	.690	.6616	.6106	+.0510	+.001
D	.870	.8758	.8148	+.0610	-.005	D	.685	.6623	.6134	+.0489	+.013
1921						1926					
J	.831	.8627	.8112	+.0515	-.011	J	.672	.6623	.6165	+.0458	+.007
F	.826	.8494	.8079	+.0415	-.007	F	.659	.6621	.6202	+.0419	+.008
M	.823	.8362	.8040	+.0322	+.006	M	.662	.6617	.6242	+.0375	+.014
A	.815	.8232	.7997	+.0235	+.008	A	.619	.6611	.6287	+.0324	+.006
M	.817	.8103	.7950	+.0153	+.006	M	.609	.6603	.6336	+.0267	.000
J	.825	.7971	.7903	+.0068	.000	J	.638	.6593	.6389	+.0204	-.022
J	.796	.7834	.7853	-.0019	-.009	J	.661	.6586	.6446	+.0140	-.022
A	.784	.7688	.7801	-.0113	-.007	A	.675	.6582	.6505	+.0077	-.007
S	.753	.7530	.7746	-.0216	-.006	S	.687	.6585	.6566	+.0019	+.004
O	.733	.7361	.7689	-.0328	-.002	O	.688	.6592	.6632	-.0040	+.010
N	.717	.7184	.7633	-.0449	-.001	N	.669	.6602	.6698	-.0096	+.001
D	.707	.7005	.7575	-.0570	+.002	D	.662	.6607	.6766	-.0158	+.007
1922						1927					
J	.681	.6833	.7513	-.0680	-.004	J	.656	.6603	.6833	-.0230	+.002
F	.679	.6676	.7453	-.0777	+.009	F	.640	.6581	.6903	-.0322	+.005
M	.661	.6545	.7392	-.0847	+.015	M	.638	.6542	.6970	-.0429	+.007
A	.633	.6443	.7330	-.0885	+.011	A	.637	.6484	.7033	-.0550	+.004
M	.613	.6381	.7266	-.0885	+.007	M	.640	.6413	.7097	-.0685	-.001
J	.622	.6353	.7203	-.0850	-.007	J	.662	.6338	.7157	-.0821	-.019
J	.630	.6360	.7141	-.0781	-.021	J	.664	.6269	.7216	-.0948	-.017
A	.625	.6397	.7080	-.0683	-.014	A	.614	.6218	.7270	-.1053	-.003
S	.656	.6459	.7018	-.0559	-.006	S	.610	.6192	.7320	-.1127	+.010
O	.681	.6540	.6957	-.0417	-.001	O	.624	.6200	.7364	-.1163	+.013
N	.699	.6633	.6898	-.0265	-.001	N	.618	.6245	.7407	-.1160	.000
D	.682	.6734	.6839	-.0105	+.009	D	.619	.6327	.7445	-.1115	+.003
1923						1928					
J	.666	.6838	.6781	+.0057	+.003	J	.642	.6445	.7476	-.1027	-.004
F	.681	.6939	.6723	+.0216	+.010	F	.635	.6395	.7503	-.0903	+.003
M	.702	.7035	.6668	+.0367	+.021	M	.660	.6773	.7524	-.0746	+.004
A	.714	.7124	.6614	+.0510	+.012	A	.685	.6972	.7542	-.0564	+.003
M	.700	.7202	.6565	+.0637	+.005	M	.714	.7189	.7555	-.0361	-.001
J	.707	.7265	.6518	+.0747	-.016	J	.775	.7418	.7561	-.0139	-.015
J	.738	.7307	.6472	+.0835	-.029	J	.786	.7654	.7563	+.0095	-.013
A	.737	.7320	.6426	+.0894	-.018	A	.804	.7896	.7558	+.0341	-.002
S	.743	.7296	.6381	+.0915	-.005	S	.834	.8140	.7548	+.0593	+.015
O	.723	.7228	.6341	+.0887	.000	O	.835	.8380	.7530	+.0850	+.016
N	.703	.7110	.6304	+.0806	-.001	N	.838	.8610	.7507	+.1103	.000
D	.683	.6942	.6269	+.0673	+.016	D	.872	.8824	.7481	+.1341	+.001
1924						1929					
J	.674	.6727	.6236	+.0491	+.007	J	.893	.9011	.7447	+.1562	-.009
F	.667	.6478	.6206	+.0272	+.010	F	.886	.9163	.7407	+.1754	.000
M	.648	.6206	.6177	+.0029	+.023	M	.899	.9271	.7359	+.1910	+.002
A	.624	.5929	.6153	-.0224	+.012	A	.939	.9326	.7303	+.2021	+.002
M	.596	.5665	.6129	-.0464	+.003	M	.944	.9323	.7245	+.2076	-.001
J	.542	.5427	.6108	-.0681	-.022	J	.921	.9257			-.013
J	.485	.5229	.6090	-.0861	-.030	J	.906	.9126			-.012
A	.452	.5079	.6073	-.0994	-.017	A	.949	.8930			-.001
S	.474	.4985	.6057	-.1072	-.003	S	.933	.8668			+.018
O	.456	.4949	.6044	-.1095	+.003	O	.874	.8347			+.018
N	.494	.4975	.6033	-.1058	.000	N	.741	.7970			-.001
D	.533	.5060	.6025	-.0965	+.017	D	.684	.7548			-.001

TABLE 22—Concluded

TIME MONEY RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1930						1934					
J	.682	.7097			-.010	J	.047	-.0519			-.010
F	.668	.6637			-.001	F	-.040	-.0588			-.001
M	.614	.6184			+.001	M	-.057	-.0583			+.001
A	.613	.5757			+.002	A	-.057	-.0427			+.001
M	.550	.5365			-.001	M	-.055				-.001
J	.473	.5005			-.011	J	-.045				-.011
J	.455	.4672			-.011	J	-.045				-.011
A	.419	.4352			-.001	A	-.055				-.001
S	.394	.4032			+.019	S	-.075				+.019
O	.370	.3704			+.019	O	-.075				+.019
N	.339	.3376			-.001	N	-.055				-.001
D	.351	.3060			-.001	D	-.055				-.001
1931						1935					
J	.332	.2781			-.010	J	-.046				-.010
F	.275	.2566			-.001	F	-.055				-.001
M	.325	.2440			+.001	M	-.057				+.001
A	.325	.2420			+.001	A	-.253				+.001
M	.221	.2510			-.001	M	-.601				-.001
J	.160	.2708			-.011	J	-.591				-.011
J	.163	.2997			-.011	J	-.591				-.011
A	.177	.3349			-.001	A	-.601				-.001
S	.209	.3729			+.019	S	-.621				+.019
O	.485	.4100			+.019	O	-.488				+.019
N	.549	.4407			-.001	N	.001				-.001
D	.532	.4606			-.001	D	.001				-.001
1932						1936					
J	.561	.4655			-.010	J	.010				-.010
F	.560	.4523			-.001						
M	.495	.4198			+.001						
A	.429	.3696			+.001						
M	.202	.3053			-.001						
J	.187	.2325			-.011						
J	.169	.1575			-.011						
A	.141	.0869			-.001						
S	.031	.0259			+.019						
O	-.032	-.0225			+.019						
N	-.303	-.0566			-.001						
D	-.303	-.0750			-.001						
1933											
J	-.291	-.0817			-.010						
F	-.179	-.0782			-.001						
M	.467	-.0672			+.001						
A	.076	-.0520			+.001						
M	.018	-.0356			-.001						
J	-.021	-.0203			-.011						
J	.075	-.0090			-.011						
A	.034	-.0038			-.001						
S	-.213	-.0051			+.019						
O	-.180	-.0128			+.019						
N	-.080	-.0253			-.001						
D	.038	-.0398			-.001						

TABLE 23

COMMERCIAL PAPER RATES IN NEW YORK CITY¹

MONTHLY AVERAGES, JANUARY 1857-JANUARY 1936

- Col. 1. Logarithms of Data Adjusted for Seasonal Fluctuations.
- Col. 2. Cyclical Curve (logarithms).
- Col. 3. Trend Curve (logarithms).
- Col. 4. Deviations of Cyclical Curve (logarithms)
from Trend Curve (logarithms).
- Col. 5. Changing Seasonal Fluctuations (logarithms).

For details of the nature of the graduations given in Columns 2 and 3, and of the seasonal given in Column 5 of this table, see Appendix D.

¹ January 1857-December 1923 'Choice 60-90 day two name paper'.

January 1924-January 1932 '4-6 months prime double and single name paper'.

TABLE 23

COMMERCIAL PAPER RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1857						1862					
J	.933	.9297	.8917	+.0380	+.013	J	.777	.7788	.7833	-.0045	+.022
F	.929	.9529	.8868	+.0661	+.017	F	.752	.7696	.7840	-.0144	+.019
M	.979	.9787	.8819	+.0968	-.012	M	.803	.7589	.7844	-.0255	-.005
A	.979	1.0040	.8771	+.1269	-.019	A	.790	.7469	.7848	-.0379	-.005
M	.932	1.0362	.8724	+.1538	-.030	M	.711	.7342	.7850	-.0508	-.012
J	.927	1.0427	.8677	+.1750	-.031	J	.683	.7218	.7855	-.0637	-.030
J	.960	1.0511	.8631	+.1880	+.003	J	.770	.7108	.7857	-.0749	-.030
A	.997	1.0501	.8589	+.1912	+.016	A	.666	.7019	.7859	-.0840	-.013
S	1.239	1.0392	.8547	+.1845	+.015	S	.700	.6956	.7860	-.0904	-.001
O	1.365	1.0180	.8505	+.1675	+.021	O	.647	.6922	.7863	-.0941	+.006
N	1.040	.9868	.8467	+.1401	+.027	N	.658	.6918	.7868	-.0950	+.014
D	.876	.9467	.8429	+.1038		D	.707	.6942	.7870	-.0928	+.034
1858						1863					
J	.861	.8980	.8396	+.0584	+.014	J	.701	.6994	.7873	-.0879	+.023
F	.742	.8444	.8362	+.0082	+.018	F	.739	.7067	.7880	-.0813	+.017
M	.752	.7883	.8329	-.0446	-.012	M	.724	.7184	.7887	-.0703	.000
A	.737	.7335	.8300	-.0965	-.022	A	.724	.7253	.7895	-.0642	.000
M	.576	.6833	.8274	-.1441	-.015	M	.732	.7354	.7901	-.0547	-.016
J	.661	.6430	.8248	-.1818	-.026	J	.766	.7444	.7914	-.0470	-.034
J	.599	.6137	.8224	-.2087	-.030	J	.779	.7526	.7925	-.0309	-.031
A	.607	.5979	.8200	-.2221	.000	A	.740	.7598	.7940	-.0342	-.016
S	.635	.5957	.8180	-.2223	+.012	S	.751	.7664	.7954	-.0290	-.003
O	.632	.6060	.8160	-.2100	+.011	O	.748	.7729	.7973	-.0244	+.008
N	.658	.6260	.8140	-.1880	+.014	N	.800	.7799	.7992	-.0193	+.020
D	.636	.6527	.8123	-.1596	+.029	D	.798	.7880	.8011	-.0131	+.035
1859						1864					
J	.648	.6825	.8106	-.1281	+.016	J	.839	.7975	.8031	-.0056	+.024
F	.721	.7133	.8090	-.0957	+.020	F	.800	.8087	.8053	+.0034	+.013
M	.724	.7425	.8074	-.0649	-.010	M	.745	.8211	.8076	+.0135	+.003
A	.741	.7690	.8059	-.0369	-.019	A	.821	.8346	.8099	+.0247	+.005
M	.823	.7920	.8045	-.0125	-.012	M	.861	.8484	.8123	+.0361	-.022
J	.864	.8106	.8030	+.0076	-.025	J	.872	.8621	.8146	+.0475	-.039
J	.850	.8240	.8016	+.0224	-.029	J	.847	.8750	.8170	+.0580	-.034
A	.850	.8317	.8001	+.0316	-.003	A	.905	.8867	.8194	+.0673	-.019
S	.808	.8337	.7986	+.0351	+.008	S	.958	.8967	.8219	+.0748	-.004
O	.821	.8501	.7972	+.0329	+.009	O	.953	.9046	.8239	+.0807	-.011
N	.782	.8225	.7957	+.0268	+.010	N	.889	.9102	.8262	+.0840	+.030
D	.800	.8128	.7941	+.0187	+.030	D	.855	.9134	.8285	+.0849	+.038
1860						1865					
J	.884	.8032	.7925	+.0107	+.019	J	.879	.9139	.8307	+.0832	+.024
F	.831	.7959	.7909	+.0050	+.020	F	.920	.9124	.8327	+.0797	+.009
M	.780	.7925	.7895	+.0030	-.009	M	.948	.9092	.8345	+.0747	+.006
A	.763	.7940	.7881	+.0059	-.015	A	.921	.9049	.8363	+.0686	+.008
M	.773	.8003	.7868	+.0135	-.010	M	.884	.9002	.8381	+.0621	-.027
J	.766	.8106	.7854	+.0252	-.026	J	.871	.8954	.8397	+.0557	-.045
J	.760	.8238	.7842	+.0396	-.028	J	.899	.8908	.8412	+.0496	-.036
A	.791	.8384	.7832	+.0552	-.006	A	.909	.8862	.8426	+.0436	-.023
S	.841	.8526	.7822	+.0704	+.004	S	.855	.8812	.8440	+.0372	-.004
O	.826	.8654	.7813	+.0841	+.007	O	.866	.8752	.8452	+.0300	+.015
N	1.037	.8757	.7807	+.0950	+.009	N	.863	.8677	.8464	+.0213	+.040
D	1.080	.8827	.7801	+.1026	+.031	D	.851	.8586	.8476	+.0110	+.041
1861						1866					
J	.882	.8857	.7797	+.1060	+.021	J	.843	.8479	.8487	-.0008	+.024
F	.842	.8848	.7794	+.1054	+.021	F	.858	.8361	.8497	-.0136	+.004
M	.791	.8796	.7792	+.1004	-.006	M	.856	.8237	.8507	-.0270	+.009
A	.803	.8707	.7792	+.0915	-.011	A	.814	.8119	.8517	-.0398	+.012
M	.918	.8593	.7795	+.0798	-.010	M	.815	.8013	.8527	-.0514	-.033
J	.840	.8464	.7797	+.0667	-.027	J	.797	.7925	.8538	-.0613	-.052
J	.769	.8332	.7800	+.0532	-.029	J	.809	.7863	.8548	-.0685	-.039
A	.822	.8210	.7804	+.0406	-.009	A	.795	.7830	.8557	-.0727	-.025
S	.798	.8105	.7810	+.0295	+.001	S	.723	.7826	.8568	-.0742	-.003
O	.827	.8016	.7817	+.0199	+.006	O	.717	.7854	.8578	-.0724	+.019
N	.789	.7939	.7824	+.0115	+.010	N	.776	.7913	.8589	-.0676	+.049
D	.813	.7867	.7830	+.0037	+.032	D	.793	.7997	.8600	-.0603	+.045

SHORT TERM INTEREST RATES

A239

TABLE 23—Continued

COMMERCIAL PAPER RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1867						1872					
J	.846	.8103	.8611	-.0508	+.023	J	.899	.8880	.9080	-.0200	+.020
F	.851	.8224	.8622	-.0398	-.002	F	.900	.8982	.9080	-.0098	-.021
M	.847	.8351	.8632	-.0281	+.010	M	.930	.9077	.9079	-.0002	+.007
A	.842	.8473	.8642	-.0169	+.014	A	.923	.9163	.9076	+.0087	+.016
M	.863	.8581	.8652	-.0071	-.039	M	.916	.9236	.9071	+.0165	-.059
J	.925	.8668	.8662	+.0006	-.057	J	.854	.9295	.9067	+.0228	-.076
J	.858	.8725	.8672	+.0053	-.042	J	.879	.9340	.9059	+.0281	-.069
A	.841	.8752	.8682	+.0070	-.028	A	.916	.9375	.9050	+.0325	-.037
S	.853	.8751	.8692	+.0059	-.001	S	.978	.9407	.9041	+.0366	+.022
O	.899	.8724	.8700	+.0024	+.025	O	.972	.9447	.9029	+.0418	+.061
N	.875	.8680	.8709	-.0029	+.057	N	.993	.9503	.9016	+.0487	+.072
D	.851	.8627	.8718	-.0091	+.049	D	.964	.9578	.9001	+.0577	+.071
1868						1873					
J	.827	.8572	.8729	-.0157	+.022	J	.948	.9671	.8987	+.0684	+.020
F	.821	.8519	.8738	-.0219	-.008	F	.995	.9776	.8968	+.0308	-.023
M	.874	.8475	.8747	-.0272	+.011	M	1.000	.9880	.8949	+.0931	+.005
A	.887	.8443	.8756	-.0313	+.016	A	1.043	.9966	.8929	+.1037	+.014
M	.866	.8424	.8765	-.0341	-.045	M	.970	1.0022	.8905	+.1117	-.060
J	.819	.8421	.8774	-.0353	-.062	J	.911	1.0041	.8879	+.1162	-.077
J	.859	.8439	.8783	-.0344	-.046	J	.883	1.0016	.8851	+.1165	-.074
A	.851	.8480	.8791	-.0311	-.030	A	.886	.9948	.8821	+.1127	-.037
S	.827	.8548	.8800	-.0252	+.002	S	1.128	.9844	.8788	+.1056	+.027
O	.840	.8649	.8807	-.0158	+.032	O	1.152	.9707	.8752	+.0955	+.065
N	.937	.8784	.8815	-.0031	+.063	N	1.091	.9541	.8715	+.0826	+.070
D	.862	.8950	.8823	+.0127	+.054	D	.920	.9349	.8674	+.0675	+.072
1869						1874					
J	.899	.9143	.8831	+.0312	+.021	J	.852	.9131	.8632	+.0499	+.020
F	.898	.9351	.8840	+.0511	-.012	F	.801	.8888	.8588	+.0300	-.023
M	.962	.9561	.8846	+.0715	+.011	M	.784	.8626	.8541	+.0085	+.004
A	.978	.9756	.8853	+.0903	+.017	A	.783	.8355	.8492	-.0137	+.013
M	.943	.9920	.8859	+.1061	-.050	M	.812	.8090	.8439	-.0349	-.059
J	1.052	1.0039	.8864	+.1175	-.067	J	.823	.7845	.8387	-.0542	-.078
J	1.062	1.0100	.8870	+.1230	-.051	J	.828	.7637	.8331	-.0694	-.079
A	1.012	1.0099	.8876	+.1223	-.032	A	.772	.7473	.8276	-.0803	-.036
S	1.033	1.0037	.8881	+.1156	+.006	S	.765	.7355	.8216	-.0691	+.031
O	.977	.9917	.8887	+.1030	+.039	O	.697	.7277	.8159	-.0382	+.067
N	1.009	.9750	.8892	+.0858	+.068	N	.682	.7231	.8100	-.0869	+.068
D	.947	.9551	.8898	+.0653	+.060	D	.707	.7206	.8038	-.0832	+.071
1870						1875					
J	.934	.9339	.8903	+.0436	+.020	J	.699	.7192	.7973	-.0781	+.021
F	.884	.9127	.8909	+.0218	-.016	F	.738	.7186	.7909	-.0723	-.023
M	.865	.8932	.8915	+.0017	+.010	M	.767	.7188	.7845	-.0657	+.004
A	.840	.8764	.8921	-.0157	+.017	A	.724	.7202	.7782	-.0580	+.012
M	.859	.8678	.8928	-.0300	-.054	M	.717	.7232	.7724	-.0492	-.058
J	.808	.8524	.8935	-.0411	-.071	J	.735	.7278	.7661	-.0383	-.077
J	.863	.8446	.8943	-.0497	-.058	J	.716	.7337	.7602	-.0265	-.082
A	.890	.8387	.8952	-.0565	-.034	A	.728	.7399	.7543	-.0144	-.034
S	.848	.8335	.8962	-.0627	+.012	S	.737	.7455	.7483	-.0028	+.035
O	.814	.8284	.8972	-.0688	+.048	O	.733	.7493	.7426	-.0067	+.069
N	.789	.8230	.8982	-.0752	+.071	N	.741	.7509	.7370	+.0139	+.065
D	.877	.8173	.8992	-.0819	+.065	D	.751	.7499	.7317	+.0182	+.069
1871						1876					
J	.839	.8118	.9002	-.0884	+.020	J	.789	.7467	.7266	+.0201	+.021
F	.840	.8074	.9012	-.0938	-.019	F	.749	.7417	.7217	+.0200	-.022
M	.788	.8050	.9021	-.0971	+.008	M	.727	.7351	.7170	+.0181	+.005
A	.815	.8051	.9030	-.0979	+.016	A	.730	.7271	.7128	+.0143	+.010
M	.798	.8079	.9039	-.0960	-.058	M	.759	.7179	.7087	+.0092	-.056
J	.778	.8136	.9047	-.0911	-.074	J	.753	.7077	.7051	+.0026	-.076
J	.754	.8216	.9054	-.0838	-.064	J	.667	.6967	.7018	-.0051	-.086
A	.778	.8314	.9060	-.0746	-.036	A	.587	.6856	.6987	-.0131	-.031
S	.806	.8425	.9068	-.0643	+.017	S	.642	.6753	.6959	-.0206	+.035
O	.946	.8541	.9071	-.0530	+.055	O	.685	.6668	.6935	-.0267	+.069
N	.897	.8657	.9075	-.0418	+.072	N	.674	.6610	.6916	-.0306	+.062
D	.929	.8771	.9078	-.0307	+.069	D	.704	.6588	.6899	-.0311	+.065

TABLE 23—Continued

COMMERCIAL PAPER RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1877						1882					
J	.725	.6604	.6884	-.0280	+.019	J	.733	.7331	.7390	-.0059	+.007
F	.674	.6656	.6874	-.0218	-.021	F	.758	.7393	.7399	-.0006	-.020
M	.641	.6738	.6866	-.0128	+.006	M	.747	.7445	.7407	+.0038	+.004
A	.632	.6842	.6860	-.0018	+.009	A	.709	.7482	.7410	+.0072	-.005
M	.655	.6957	.6853	+.0102	-.053	M	.730	.7505	.7441	+.0094	-.044
J	.682	.7073	.6833	+.0220	-.073	J	.768	.7516	.7410	+.0106	-.059
J	.704	.7183	.6852	+.0381	-.087	J	.732	.7521	.7405	+.0116	-.067
A	.779	.7278	.6854	+.0424	-.028	A	.756	.7528	.7398	+.0130	-.004
S	.769	.7353	.6857	+.0496	+.036	S	.790	.7543	.7390	+.0153	+.039
O	.791	.7404	.6859	+.0545	+.069	O	.769	.7569	.7377	+.0192	+.056
N	.732	.7425	.6863	+.0562	+.060	N	.764	.7607	.7363	+.0244	+.049
D	.689	.7410	.6867	+.0543	+.061	D	.725	.7648	.7346	+.0302	+.044
1878						1883					
J	.750	.7359	.6873	+.0486	+.017	J	.734	.7683	.7327	+.0356	+.006
F	.745	.7272	.6877	+.0395	-.020	F	.735	.7703	.7367	+.0396	-.022
M	.701	.7152	.6882	+.0270	+.003	M	.803	.7699	.7285	+.0414	+.002
A	.722	.7008	.6886	+.0122	+.008	A	.773	.7668	.7263	+.0405	-.009
M	.707	.6854	.6889	-.0035	-.051	M	.772	.7610	.7238	+.0372	-.044
J	.652	.6702	.6822	-.0150	-.071	J	.796	.7533	.7215	+.0318	-.056
J	.641	.6566	.6826	-.0330	-.085	J	.738	.7447	.7190	+.0257	-.059
A	.604	.6460	.6829	-.0439	-.023	A	.749	.7360	.7163	+.0197	.000
S	.628	.6391	.6900	-.0509	+.037	S	.738	.7283	.7138	+.0145	+.040
O	.669	.6360	.6904	-.0544	+.067	O	.725	.7224	.7113	+.0111	+.053
N	.651	.6369	.6907	-.0538	+.058	N	.708	.7185	.7089	+.0096	+.047
D	.648	.6413	.6910	-.0497	+.056	D	.697	.7167	.7066	+.0101	+.044
1879						1884					
J	.622	.6483	.6912	-.0429	+.014	J	.685	.7168	.7042	+.0126	+.004
F	.609	.6572	.6918	-.0346	-.019	F	.701	.7185	.7020	+.0165	-.024
M	.697	.6674	.6923	-.0249	+.007	M	.666	.7212	.6998	+.0214	-.001
A	.732	.6782	.6929	-.0147	+.004	A	.686	.7245	.6978	+.0267	-.012
M	.696	.6890	.6934	-.0044	-.049	M	.747	.7277	.6958	+.0319	-.043
J	.696	.6997	.6943	+.0054	-.068	J	.813	.7301	.6938	+.0363	-.053
J	.673	.7096	.6952	+.0144	-.082	J	.827	.7309	.6921	+.0388	-.052
A	.763	.7184	.6961	+.0223	-.018	A	.736	.7292	.6904	+.0388	+.004
S	.724	.7259	.6971	+.0288	+.038	S	.700	.7243	.6888	+.0355	+.040
O	.710	.7316	.6982	+.0334	+.064	O	.689	.7157	.6871	+.0286	+.051
N	.741	.7353	.6994	+.0359	+.056	N	.670	.7034	.6856	+.0178	+.045
D	.723	.7370	.7006	+.0364	+.052	D	.656	.6879	.6842	+.0037	+.044
1880						1885					
J	.720	.7369	.7019	+.0350	+.011	J	.669	.6702	.6829	-.0127	+.002
F	.744	.7355	.7031	+.0324	-.019	F	.680	.6515	.6816	-.0301	-.027
M	.733	.7330	.7045	+.0285	+.007	M	.653	.6333	.6804	-.0471	-.003
A	.739	.7300	.7059	+.0241	+.001	A	.615	.6169	.6794	-.0625	-.016
M	.762	.7268	.7073	+.0195	-.047	M	.609	.6029	.6784	-.0755	-.043
J	.723	.7235	.7088	+.0147	-.065	J	.601	.5920	.6774	-.0854	-.051
J	.725	.7200	.7103	+.0097	-.078	J	.589	.5841	.6765	-.0924	-.045
A	.714	.7162	.7118	+.0044	-.012	A	.560	.5792	.6758	-.0966	-.006
S	.682	.7119	.7133	-.0014	+.038	S	.533	.5771	.6753	-.0982	-.042
O	.648	.7071	.7149	-.0078	+.061	O	.553	.5778	.6747	-.0969	-.049
N	.683	.7022	.7165	-.0143	+.053	N	.604	.5812	.6742	-.0930	-.043
D	.729	.6978	.7180	-.0202	+.049	D	.610	.5874	.6740	-.0866	+.043
1881						1886					
J	.711	.6943	.7198	-.0255	+.009	J	.633	.5963	.6739	-.0776	+.001
F	.730	.6921	.7213	-.0292	-.019	F	.621	.6077	.6738	-.0661	-.030
M	.738	.6916	.7231	-.0315	+.006	M	.593	.6306	.6739	-.0533	-.005
A	.717	.6925	.7248	-.0323	-.002	A	.647	.6345	.6741	-.0396	-.019
M	.655	.6946	.7268	-.0322	-.046	M	.651	.6484	.6744	-.0260	-.042
J	.606	.6975	.7284	-.0309	-.062	J	.633	.6618	.6748	-.0130	-.048
J	.675	.7009	.7300	-.0291	-.073	J	.635	.6743	.6755	-.0012	-.039
A	.703	.7048	.7318	-.0270	-.008	A	.706	.6861	.6761	+.0100	+.009
S	.716	.7092	.7337	-.0245	+.039	S	.721	.6973	.6768	+.0205	+.044
O	.738	.7143	.7351	-.0208	+.058	O	.734	.7083	.6777	+.0306	+.048
N	.748	.7201	.7365	-.0164	+.051	N	.732	.7192	.6787	+.0405	+.040
D	.750	.7265	.7378	-.0113	+.046	D	.734	.7299	.6798	+.0501	+.043

SHORT TERM INTEREST RATES

A241

TABLE 23—Continued

COMMERCIAL PAPER RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1887						1892					
J	.740	.7400	.6808	+.0592	-.000	J	.623	.6231	.7062	-.0831	-.004
F	.714	.7492	.6822	+.0670	-.032	F	.604	.6020	.7038	-.1018	-.037
M	.735	.7571	.6835	+.0736	-.007	M	.600	.5836	.7009	-.1173	.000
A	.752	.7634	.6849	+.0785	-.021	A	.559	.5688	.6980	-.1292	-.019
M	.759	.7680	.6863	+.0817	-.042	M	.538	.5591	.6942	-.1351	-.038
J	.756	.7711	.6881	+.0830	-.046	J	.514	.5559	.6913	-.1354	-.044
J	.826	.7726	.6897	+.0829	-.034	J	.560	.5609	.6878	-.1269	-.020
A	.792	.7725	.6916	+.0809	+.011	A	.580	.5752	.6841	-.1089	+.018
S	.795	.7708	.6934	+.0774	+.046	S	.616	.5996	.6800	-.0804	+.057
O	.758	.7672	.6954	+.0718	+.048	O	.667	.6331	.6765	-.0434	+.046
N	.722	.7614	.6974	+.0640	-.038	N	.693	.6744	.6729	+.0015	+.018
D	.737	.7535	.6995	+.0540	+.041	D	.726	.7203	.6693	+.0510	+.044
1888						1893					
J	.749	.7438	.7016	+.0422	-.001	J	.712	.7669	.6655	+.1014	-.004
F	.720	.7326	.7036	+.0290	-.034	F	.732	.8100	.6621	+.1479	-.036
M	.725	.7206	.7056	+.0150	-.007	M	.829	.8458	.6587	+.1871	+.004
A	.755	.7085	.7076	+.0009	-.023	A	.775	.8710	.6552	+.2158	-.015
M	.725	.6970	.7096	-.0126	-.042	M	.861	.8839	.6519	+.2320	-.036
J	.673	.6862	.7113	-.0251	-.045	J	.974	.8839	.6487	+.2352	-.046
J	.640	.6764	.7127	-.0363	-.029	J	1.056	.8712	.6456	+.2256	-.019
A	.626	.6676	.7141	-.0465	+.013	A	1.007	.8471	.6426	+.2045	+.019
S	.675	.6599	.7153	-.0554	+.048	S	.860	.8131	.6396	+.1735	+.058
O	.658	.6533	.7161	-.0628	+.047	O	.726	.7711	.6367	+.1344	+.046
N	.643	.6481	.7167	-.0686	+.034	N	.626	.7229	.6339	+.0890	+.015
D	.658	.6446	.7172	-.0726	+.038	D	.555	.6709	.6314	+.0395	+.008
1889						1894					
J	.669	.6432	.7174	-.0742	-.002	J	.547	.6184	.6289	-.0105	-.005
F	.663	.6442	.7173	-.0731	-.035	F	.554	.5683	.6265	-.0582	-.035
M	.660	.6477	.7171	-.0694	-.007	M	.474	.5241	.6244	-.1003	+.007
A	.655	.6535	.7166	-.0631	-.023	A	.503	.4888	.6224	-.1336	-.012
M	.627	.6611	.7159	-.0548	-.042	M	.501	.4643	.6205	-.1562	-.034
J	.633	.6701	.7152	-.0451	-.044	J	.511	.4507	.6188	-.1681	-.047
J	.670	.6798	.7145	-.0347	-.026	J	.495	.4471	.6174	-.1703	-.018
A	.699	.6896	.7136	-.0240	+.015	A	.469	.4509	.6160	-.1651	+.018
S	.672	.6992	.7129	-.0137	+.051	S	.458	.4589	.6149	-.1560	+.058
O	.731	.7079	.7121	-.0042	+.047	O	.395	.4682	.6138	-.1456	+.046
N	.747	.7162	.7114	+.0048	+.031	N	.433	.4768	.6129	-.1361	+.013
D	.750	.7236	.7109	+.0127	+.035	D	.456	.4837	.6122	-.1285	+.003
1890						1895					
J	.730	.7301	.7107	+.0194	-.002	J	.496	.4893	.6115	-.1222	-.005
F	.739	.7353	.7104	+.0249	-.037	F	.594	.4949	.6109	-.1160	-.035
M	.747	.7394	.7103	+.0291	-.007	M	.582	.5018	.6103	-.1085	+.010
A	.731	.7419	.7105	+.0314	-.023	A	.608	.5107	.6097	-.0990	-.009
M	.745	.7433	.7110	+.0323	-.041	M	.473	.5219	.6091	-.0872	-.031
J	.743	.7440	.7116	+.0324	-.044	J	.467	.5354	.6087	-.0733	-.049
J	.726	.7445	.7123	+.0322	-.023	J	.486	.5506	.6081	-.0575	-.018
A	.731	.7455	.7129	+.0326	+.016	A	.522	.5673	.6074	-.0401	+.018
S	.707	.7472	.7136	+.0336	+.053	S	.547	.5861	.6065	-.0204	+.058
O	.725	.7500	.7144	+.0356	+.046	O	.633	.6075	.6056	+.0019	+.046
N	.802	.7539	.7152	+.0387	+.027	N	.604	.6316	.6047	+.0269	+.012
D	.836	.7585	.7159	+.0426	+.029	D	.675	.6587	.6037	+.0550	+.002
1891						1896					
J	.769	.7632	.7166	+.0466	-.003	J	.784	.6878	.6028	+.0850	-.006
F	.736	.7672	.7171	+.0501	-.037	F	.799	.7167	.6016	+.1151	-.035
M	.724	.7696	.7173	+.0523	-.004	M	.707	.7428	.6006	+.1422	+.011
A	.727	.7693	.7175	+.0518	-.021	A	.729	.7635	.5996	+.1639	-.007
M	.771	.7658	.7175	+.0483	-.040	M	.685	.7761	.5987	+.1774	-.029
J	.784	.7585	.7172	+.0413	-.044	J	.679	.7793	.5978	+.1815	-.051
J	.769	.7471	.7166	+.0305	-.021	J	.722	.7733	.5971	+.1762	-.019
A	.743	.7318	.7157	+.0161	+.017	A	.876	.7591	.5965	+.1626	+.017
S	.706	.7132	.7143	-.0011	+.056	S	.862	.7384	.5959	+.1425	+.057
O	.701	.6919	.7128	-.0209	+.046	O	.876	.7135	.5957	+.1178	+.046
N	.681	.6691	.7109	-.0418	+.023	N	.715	.6862	.5956	+.0906	+.013
D	.662	.6458	.7087	-.0629	+.022	D	.569	.6575	.5956	+.0619	+.003

TABLE 23—Continued

COMMERCIAL PAPER RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1897						1902					
J	.526	.6284	.5957	+.0327	-.006	J	.657	.6526	.6742	-.0216	-.004
F	.513	.5999	.5960	+.0039	-.036	F	.637	.6573	.6752	-.0179	-.035
M	.510	.5732	.5965	-.0233	+.012	M	.632	.6625	.6760	-.0135	+.005
A	.554	.5498	.5972	-.0474	-.006	A	.666	.6682	.6767	-.0085	-.015
M	.575	.5318	.5982	-.0664	-.027	M	.687	.6747	.6771	-.0024	-.031
J	.548	.5207	.5990	-.0783	-.054	J	.704	.6817	.6775	+.0042	-.057
J	.551	.5176	.5998	-.0822	-.020	J	.692	.6891	.6776	+.0115	-.027
A	.555	.5225	.6006	-.0781	+.016	A	.683	.6967	.6775	+.0192	+.002
S	.557	.5342	.6018	-.0676	+.056	S	.709	.7042	.6773	.0269	+.040
O	.576	.5502	.6022	-.0520	+.046	O	.728	.7114	.6771	+.0343	+.046
N	.514	.5677	.6028	-.0351	+.015	N	.724	.7181	.6767	+.0414	+.036
D	.529	.5841	.6034	-.0193	+.005	D	.735	.7243	.6763	+.0480	+.044
1898						1903					
J	.518	.5969	.6039	-.0970	-.096	J	.712	.7300	.6756	+.0544	-.003
M	.531	.6047	.6039	+.0008	-.037	M	.719	.7353	.6752	+.0601	-.034
F	.655	.6075	.6037	+.0038	+.012	F	.747	.7401	.6745	+.0656	+.002
A	.766	.6055	.6035	+.0020	-.006	A	.736	.7444	.6737	+.0707	-.018
M	.622	.5996	.6031	-.0035	-.025	M	.711	.7477	.6731	+.0746	-.034
J	.566	.5906	.6024	-.0118	-.055	J	.762	.7498	.6726	+.0772	-.056
J	.584	.5793	.6016	-.0223	-.021	J	.764	.7501	.6720	+.0781	-.028
A	.548	.5660	.6007	-.0347	+.013	A	.774	.7483	.6716	+.0767	.000
S	.561	.5518	.5995	-.0477	+.053	S	.740	.7438	.6713	+.0725	+.038
O	.487	.5377	.5985	-.0608	+.046	O	.720	.7364	.6712	+.0652	+.046
N	.502	.5253	.5974	-.0721	+.018	N	.736	.7262	.6713	+.0549	+.040
D	.469	.5164	.5963	-.0799	+.012	D	.720	.7131	.6714	+.0417	+.048
1899						1904					
J	.468	.5130	.5953	-.0823	-.006	J	.690	.6978	.6719	+.0259	-.002
M	.521	.5163	.5946	-.0783	-.037	M	.710	.6811	.6724	+.0087	-.031
F	.576	.5268	.5940	-.0672	+.011	F	.670	.6636	.6732	-.0096	.000
A	.574	.5439	.5936	-.0497	-.007	A	.629	.6464	.6741	-.0277	-.020
M	.581	.5662	.5932	-.0270	-.025	M	.629	.6304	.6754	-.0450	-.036
J	.577	.5911	.5935	-.0024	-.057	J	.612	.6163	.6765	-.0602	-.054
J	.585	.6161	.5939	+.0222	-.022	J	.577	.6046	.6780	-.0734	-.029
A	.627	.6389	.5945	+.0444	+.011	A	.590	.5957	.6797	-.0840	-.001
S	.644	.6575	.5955	+.0620	+.050	S	.598	.5897	.6815	-.0918	+.036
O	.669	.6709	.5966	+.0743	+.046	O	.597	.5864	.6833	-.0969	+.046
N	.712	.6792	.5984	+.0808	+.022	N	.574	.5857	.6852	-.0995	+.042
D	.750	.6826	.6005	+.0821	+.019	D	.581	.5872	.6871	-.0999	+.050
1900						1905					
J	.699	.6818	.6030	+.0788	-.006	J	.600	.5906	.6891	-.0985	-.001
M	.680	.6776	.6057	+.0719	-.037	M	.612	.5954	.6911	-.0957	-.029
F	.679	.6708	.6086	+.0622	+.009	F	.596	.6017	.6930	-.0913	-.002
A	.636	.6620	.6117	+.0503	-.008	A	.621	.6090	.6949	-.0859	-.022
M	.594	.6519	.6152	+.0367	-.026	M	.639	.6174	.6969	-.0795	-.039
J	.623	.6413	.6186	+.0227	-.057	J	.627	.6267	.6987	-.0720	-.053
J	.629	.6310	.6222	+.0088	-.024	J	.644	.6370	.7004	-.0634	-.029
A	.614	.6218	.6260	+.0042	+.008	A	.625	.6483	.7020	-.0537	-.002
S	.591	.6145	.6302	-.0157	+.046	S	.639	.6604	.7036	-.0432	+.035
O	.657	.6098	.6341	-.0243	+.046	O	.649	.6732	.7050	-.0318	+.046
N	.616	.6078	.6379	-.0301	+.027	N	.703	.6865	.7063	-.0198	+.044
D	.648	.6083	.6417	-.0334	+.029	D	.713	.6997	.7077	-.0080	+.051
1901						1906					
J	.610	.6108	.6454	-.0346	-.005	J	.703	.7127	.7085	+.0042	.000
F	.603	.6146	.6489	-.0343	-.036	F	.729	.7249	.7097	+.0152	-.027
M	.567	.6188	.6522	-.0334	+.007	M	.727	.7361	.7104	+.0257	-.004
A	.610	.6230	.6554	-.0324	-.011	A	.759	.7459	.7111	+.0348	-.023
M	.628	.6268	.6584	-.0316	-.029	M	.766	.7542	.7115	+.0427	-.040
J	.652	.6300	.6611	-.0311	-.057	J	.771	.7608	.7123	+.0485	-.051
J	.659	.6329	.6636	-.0307	-.026	J	.766	.7657	.7128	+.0529	-.029
A	.649	.6357	.6660	-.0303	+.005	A	.776	.7690	.7130	+.0560	.001
S	.652	.6384	.6681	-.0297	+.042	S	.783	.7708	.7131	+.0577	+.034
O	.621	.6415	.6698	-.0283	+.046	O	.753	.7717	.7136	+.0581	+.046
N	.642	.6448	.6715	-.0266	+.032	N	.751	.7722	.7137	+.0587	+.045
D	.657	.6485	.6729	-.0244	+.037	D	.745	.7729	.7138	+.0591	+.051

SHORT TERM INTEREST RATES

A243

TABLE 23—Continued

COMMERCIAL PAPER RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1907						1912					
J	.790	.7746	.7139	+.0607	-.001	J	.637	.6112	.6740	-.0628	-.016
F	.800	.7779	.7140	+.0639	-.026	F	.599	.6193	.6768	-.0575	-.025
M	.797	.7828	.7140	+.0588	-.006	M	.637	.6281	.6794	-.0513	-.015
A	.798	.7893	.7139	+.0754	-.024	A	.640	.6375	.6816	-.0441	-.023
M	.778	.7968	.7136	+.0832	-.040	M	.648	.6475	.6840	-.0365	-.026
J	.785	.8042	.7130	+.0912	-.049	J	.626	.6582	.6855	-.0273	-.024
J	.788	.8102	.7126	+.0976	-.028	J	.664	.6636	.6868	-.0172	-.009
A	.795	.8139	.7120	+.1019	+.001	A	.682	.6817	.6879	-.0062	+.017
S	.800	.8138	.7111	+.1027	+.033	S	.717	.6945	.6887	+.0058	+.028
O	.805	.8092	.7100	+.0292	+.046	O	.737	.7077	.6889	+.0188	+.034
N	.816	.7998	.7086	+.0912	+.044	N	.734	.7213	.6887	+.0326	+.023
D	.844	.7855	.7070	+.0785	+.050	D	.749	.7346	.6881	+.0465	+.029
1908						1913					
J	.813	.7666	.7052	+.0614	-.002	J	.701	.7471	.6871	+.0600	-.019
F	.729	.7441	.7032	+.0409	-.025	F	.714	.7581	.6857	+.0724	-.024
M	.762	.7188	.7008	+.0180	-.008	M	.775	.7664	.6839	+.0825	-.015
A	.674	.6917	.6982	+.0065	-.025	A	.763	.7711	.6820	+.0891	-.021
M	.634	.6640	.6951	+.0311	-.039	M	.749	.7714	.6798	+.0916	-.021
J	.608	.6371	.6919	+.0548	-.047	J	.786	.7667	.6773	+.0894	-.017
J	.600	.6119	.6886	+.0767	-.026	J	.786	.7571	.6746	+.0825	-.005
A	.552	.5895	.6850	.0935	+.004	A	.760	.7435	.6717	+.0718	+.018
S	.561	.5711	.6812	+.1101	+.033	S	.738	.7273	.6684	+.0589	+.026
O	.563	.5570	.6775	+.1205	+.046	O	.723	.7100	.6652	+.0448	+.030
N	.563	.5477	.6737	+.1260	+.042	N	.728	.6935	.6618	+.0317	+.017
D	.538	.5431	.6697	+.1266	+.047	D	.732	.6795	.6582	+.0213	+.023
1909						1914					
J	.575	.5427	.6654	+.1227	-.004	J	.677	.6689	.6548	+.0141	-.021
F	.573	.5457	.6617	+.1160	-.025	F	.607	.6622	.6509	+.0113	-.022
M	.554	.5514	.6579	+.1065	-.010	M	.599	.6594	.6475	+.0119	-.015
A	.570	.5588	.6543	+.0955	-.026	A	.591	.6599	.6440	+.0159	-.018
M	.574	.5675	.6503	+.0828	-.037	M	.605	.6631	.6405	+.0226	-.016
J	.555	.5770	.6472	+.0702	-.043	J	.596	.6679	.6371	+.0308	-.009
J	.551	.5873	.6441	+.0568	-.022	J	.648	.6734	.6337	+.0397	-.001
A	.599	.5989	.6412	+.0423	+.007	A	.783	.6784	.6302	+.0482	+.019
S	.589	.6117	.6382	+.0265	+.032	S	.805	.6817	.6267	+.0550	+.021
O	.657	.6261	.6359	+.0098	+.045	O	.786	.6822	.6235	+.0587	+.023
N	.664	.6419	.6339	+.0080	+.039	N	.729	.6786	.6203	+.0583	+.011
D	.665	.6586	.6321	+.0265	+.043	D	.621	.6698	.6171	+.0527	+.018
1910						1915					
J	.685	.6752	.6306	+.0446	-.008	J	.607	.6556	.6140	+.0416	-.022
F	.673	.6906	.6294	+.0612	-.026	F	.593	.6362	.6110	+.0252	-.019
M	.665	.7038	.6286	+.0752	-.012	M	.543	.6126	.6083	+.0043	-.014
A	.702	.7135	.6282	+.0853	-.025	A	.577	.5868	.6057	-.0189	-.014
M	.711	.7191	.6280	+.0911	-.034	M	.582	.5611	.6031	-.0420	-.011
J	.730	.7202	.6283	+.0919	-.038	J	.565	.5377	.6008	-.0631	-.003
J	.749	.7173	.6287	+.0886	-.018	J	.510	.5187	.5986	-.0799	+.002
A	.724	.7105	.6295	+.0810	+.011	A	.531	.5050	.5967	-.0917	+.018
S	.711	.7006	.6303	+.0703	+.032	S	.498	.4969	.5949	-.0980	+.018
O	.703	.6885	.6317	+.0568	+.042	O	.490	.4935	.5935	-.1000	+.018
N	.706	.6750	.6335	+.0415	+.034	N	.470	.4939	.5921	-.0982	+.006
D	.639	.6605	.6353	+.0252	+.039	D	.478	.4965	.5911	-.0946	+.012
1911						1916					
J	.612	.6460	.6372	+.0088	-.011	J	.516	.5001	.5904	-.0903	-.022
F	.635	.6321	.6396	-.0075	-.026	F	.510	.5038	.5898	-.0860	-.016
M	.605	.6193	.6421	-.0228	-.014	M	.505	.5078	.5897	-.0819	-.011
A	.506	.6081	.6448	-.0367	-.024	A	.504	.5120	.5900	-.0780	-.010
M	.589	.5992	.6480	-.0488	-.030	M	.500	.5168	.5909	-.0741	-.006
J	.598	.5927	.6510	-.0583	-.032	J	.557	.5227	.5918	-.0691	+.002
J	.590	.5889	.6542	-.0653	-.013	J	.596	.5299	.5933	-.0634	+.003
A	.608	.5878	.6577	-.0699	+.014	A	.557	.5383	.5953	-.0570	+.014
S	.626	.5891	.6611	-.0720	+.030	S	.516	.5478	.5973	-.0495	+.013
O	.600	.5924	.6646	-.0722	+.039	O	.511	.5582	.6002	-.0420	+.012
N	.566	.5974	.6678	-.0704	+.029	N	.541	.5692	.6034	-.0342	+.002
D	.631	.6038	.6710	-.0672	+.034	D	.584	.5807	.6068	-.0261	+.008

TABLE 23—Continued

COMMERCIAL PAPER RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1917						1922					
J	.546	.5930	.6105	-.0175	-.016	J	.694	.6866	.7483	-.0617	-.003
F	.624	.6061	.6151	-.0090	-.012	F	.690	.6688	.7432	-.0744	-.002
M	.623	.6202	.6197	+.0005	-.008	M	.682	.6534	.7383	-.0849	-.002
A	.638	.6351	.6246	+.0105	-.007	A	.661	.6409	.7329	-.0920	-.002
M	.688	.6508	.6305	+.0203	-.004	M	.632	.6317	.7273	-.0956	-.001
J	.698	.6668	.6364	+.0304	+.002	J	.605	.6259	.7220	-.0961	.000
J	.668	.6826	.6425	+.0401	+.002	J	.596	.6234	.7167	-.0933	.000
A	.670	.6978	.6491	+.0487	+.011	A	.587	.6241	.7111	-.0870	+.002
S	.704	.7118	.6562	+.0556	+.010	S	.620	.6277	.7056	-.0779	+.002
O	.722	.7244	.6632	+.0612	+.009	O	.640	.6339	.7002	-.0663	+.002
N	.735	.7355	.6705	+.0650	+.002	N	.664	.6422	.6947	-.0525	.000
D	.734	.7451	.6780	+.0671	+.006	D	.664	.6520	.6893	-.0373	+.001
1918						1923					
J	.758	.7533	.6859	+.0674	-.012	J	.667	.6627	.6840	-.0213	-.002
F	.763	.7602	.6935	+.0667	-.009	F	.672	.6737	.6787	-.0050	-.002
M	.775	.7658	.7015	+.0643	-.006	M	.703	.6842	.6734	+.0108	-.001
A	.777	.7701	.7093	+.0608	-.005	A	.701	.6940	.6683	+.0257	-.001
M	.772	.7730	.7170	+.0560	-.003	M	.710	.7025	.6631	+.0394	-.001
J	.768	.7743	.7248	+.0495	+.001	J	.691	.7094	.6581	+.0513	.000
J	.768	.7741	.7322	+.0419	+.002	J	.695	.7144	.6533	+.0611	.000
A	.766	.7722	.7395	+.0327	+.008	A	.701	.7170	.6486	+.0684	+.001
S	.771	.7690	.7468	+.0222	+.007	S	.708	.7168	.6440	+.0728	+.001
O	.772	.7645	.7536	+.0109	+.007	O	.708	.7135	.6397	+.0738	+.001
N	.775	.7591	.7601	-.0010	+.001	N	.707	.7067	.6355	+.0712	.000
D	.760	.7530	.7665	-.0135	+.005	D	.687	.6961	.6314	+.0647	+.001
1919						1924					
J	.729	.7464	.7723	-.0259	-.009	J	.689	.6820	.6275	+.0545	-.001
F	.720	.7398	.7779	-.0381	-.006	F	.680	.6647	.6242	+.0405	-.001
M	.735	.7336	.7828	-.0492	-.004	M	.666	.6451	.6208	+.0243	-.001
A	.735	.7283	.7874	-.0591	-.004	A	.666	.6242	.6176	+.0066	-.001
M	.733	.7245	.7918	-.0673	-.002	M	.622	.6031	.6145	-.0114	.000
J	.742	.7228	.7954	-.0726	+.001	J	.599	.5830	.6118	-.0288	.000
J	.734	.7236	.7988	-.0752	+.001	J	.547	.5650	.6093	-.0443	.000
A	.726	.7272	.8017	-.0745	+.006	A	.511	.5499	.6069	-.0570	+.001
S	.726	.7339	.8042	-.0703	+.005	S	.493	.5386	.6050	-.0664	+.001
O	.726	.7434	.8063	-.0629	+.005	O	.493	.5320	.6032	-.0712	+.001
N	.739	.7556	.8078	-.0522	+.001	N	.508	.5294	.6016	-.0722	.000
D	.766	.7699	.8091	-.0392	+.003	D	.550	.5313	.6004	-.0691	+.001
1920						1925					
J	.784	.7859	.8101	-.0242	-.006	J	.560	.5374	.5993	-.0619	-.001
F	.811	.8030	.8107	-.0077	-.005	F	.560	.5475	.5983	-.0508	.000
M	.827	.8207	.8111	+.0096	-.003	M	.594	.5595	.5975	-.0380	.000
A	.837	.8384	.8111	+.0273	-.003	A	.596	.5758	.5970	-.0212	.000
M	.857	.8554	.8105	+.0449	-.002	M	.589	.5901	.5967	-.0066	.000
J	.887	.8711	.8100	+.0611	+.001	J	.589	.6032	.5965	+.0067	.000
J	.893	.8849	.8091	+.0758	+.001	J	.592	.6138	.5966	+.0172	.000
A	.899	.8960	.8077	+.0883	+.004	A	.599	.6216	.5968	+.0248	+.001
S	.897	.9039	.8062	.0977	+.004	S	.620	.6245	.5971	+.0274	+.001
O	.900	.9082	.8045	+.1037	+.003	O	.641	.6268	.5978	+.0290	.000
N	.898	.9086	.8024	+.1062	+.001	N	.641	.6273	.5986	+.0287	.000
D	.895	.9051	.8001	+.1050	+.002	D	.641	.6268	.5996	+.0272	.000
1921						1926					
J	.898	.8981	.7974	+.1007	-.005	J	.638	.6260	.6007	+.0253	.000
F	.892	.8880	.7947	+.0933	-.003	F	.618	.6252	.6023	+.0229	.000
M	.884	.8753	.7916	+.0837	-.002	M	.631	.6247	.6041	+.0206	.000
A	.881	.8607	.7883	+.0724	-.002	A	.622	.6245	.6061	+.0184	.000
M	.842	.8444	.7843	+.0601	-.001	M	.605	.6244	.6081	+.0163	.000
J	.827	.8269	.7806	+.0463	.000	J	.589	.6243	.6107	+.0136	.000
J	.797	.8083	.7766	+.0317	+.001	J	.596	.6243	.6135	+.0108	.000
A	.772	.7888	.7722	+.0166	+.003	A	.625	.6244	.6164	+.0080	.000
S	.766	.7685	.7676	+.0009	+.003	S	.643	.6246	.6195	+.0051	.000
O	.747	.7477	.7628	-.0151	+.003	O	.656	.6250	.6229	+.0021	.000
N	.713	.7267	.7581	-.0314	.000	N	.647	.6253	.6264	-.0011	.000
D	.707	.7061	.7532	-.0471	+.002	D	.643	.6254	.6302	-.0048	.000

SHORT TERM INTEREST RATES

A245

TABLE 23—Concluded

COMMERCIAL PAPER RATES

Date	1	2	3	4	5	Date	1	2	3	4	5
1927						1932					
J	.622	.6247	.6341	-.0094	.000	J	.602	.5319			.000
F	.592	.6220	.6377	-.0148	.000	F	.589	.5373			.000
M	.602	.6197	.6416	-.0219	.000	M	.547	.5309			.000
A	.612	.6151	.6456	-.0305	.000	A	.529	.5130			.000
M	.616	.6095	.6497	-.0402	.000	M	.477	.4852			.000
J	.616	.6034	.6534	-.0500	.000	J	.444	.4500			.000
J	.609	.5976	.6572	-.0596	.000	J	.408	.4112			.000
A	.591	.5930	.6604	-.0674	.000	A	.338	.3726			.000
S	.592	.5904	.6637	-.0733	.000	S	.326	.3371			.000
O	.602	.5904	.6664	-.0760	.000	O	.288	.3066			.000
N	.594	.5932	.6692	-.0760	.000	N	.241	.2826			.000
D	.599	.5990	.6706	-.0716	.000	D	.179	.2651			.000
1928						1933					
J	.589	.6076	.6739	-.0663	.000	J	.140	.2532			.000
F	.601	.6185	.6757	-.0572	.000	F	.140	.2458			.000
M	.622	.6311	.6773	-.0462	.000	M	.444	.2413			.000
A	.634	.6451	.6784	-.0333	.000	A	.408	.2379			.000
M	.658	.6597	.6791	-.0194	.000	M	.318	.2340			.000
J	.674	.6745	.6796	-.0051	.000	J	.228	.2280			.000
J	.707	.6891	.6798	+ .0093	.000	J	.176	.2181			.000
A	.734	.7031	.6795	+ .0236	.000	A	.176	.2033			.000
S	.747	.7162	.6790	+ .0372	.000	S	.097	.1832			.000
O	.741	.7284	.6783	+ .0501	.000	O	.097	.1578			.000
N	.731	.7394	.6770	+ .0624	.000	N	.097	.1281			.000
D	.736	.7493	.6754	+ .0739	.000	D	.149	.0956			.000
1929						1934					
J	.740	.7581	.6738	+ .0843	.000	J	.097	.0623			.000
F	.745	.7658	.6716	+ .0942	.000	F	.086	.0300			.000
M	.755	.7723	.6692	+ .1031	.000	M	.000	-.0002			.000
A	.769	.7774	.6666	+ .1108	.000	A	.000	-.0273			.000
M	.778	.7808	.6638	+ .1170	.000	M	.046				.000
J	.778	.7819			.000	J	.125				.000
J	.778	.7800			.000	J	.125				.000
A	.784	.7745			.000	A	.125				.000
S	.787	.7648			.000	S	.125				.000
O	.787	.7506			.000	O	.125				.000
N	.733	.7318			.000	N	.125				.000
D	.699	.7090			.000	D	.125				.000
1930						1935					
J	.690	.6832			.000	J	.125				.000
F	.665	.6557			.000	F	.125				.000
M	.613	.6278			.000	M	.125				.000
A	.589	.6009			.000	A	.125				.000
M	.566	.5756			.000	M	.125				.000
J	.537	.5520			.000	J	.125				.000
J	.498	.5297			.000	J	.125				.000
A	.477	.5077			.000	A	.125				.000
S	.477	.4853			.000	S	.125				.000
O	.477	.4620			.000	O	.125				.000
N	.473	.4379			.000	N	.125				.000
D	.475	.4141			.000	D	.125				.000
1931						1936					
J	.450	.3918			.000	J	.125				.000
F	.398	.3731			.000						
M	.403	.3600			.000						
A	.380	.3538			.000						
M	.326	.3554			.000						
J	.326	.3652			.000						
J	.290	.3826			.000						
A	.274	.4063			.000						
S	.274	.4343			.000						
O	.525	.4642			.000						
N	.602	.4926			.000						
D	.602	.5161			.000						

TABLE 24

COMMERCIAL PAPER RATES IN BOSTON MONTHLY 1831-1860

(From Joseph G. Martin's "Seventy-three Years' History of the Boston Stock Market" pages 37 and 38. Martin's table is preceded by the statement that "the following rates are for first-class, three to six months, bankable paper. Loans 'on call' range from 1 to 3 per cent lower." Martin's table goes to 1871. In his later volume "One Hundred Years' History of the Boston Stock Market" it is continued through 1897.)

1831.—Jan., $5\frac{1}{2}$ per cent, and gradually rose to 7, the rate for last four months of year.

1832.—Opened at 7 per cent; declined to 6 in March; rose to 7 in May; thence for the year, 6 per cent.

1833.—Opened at 6 per cent; declined to $5\frac{1}{2}$; rose to $6\frac{1}{2}$ and to 8, July, Aug., and Sept.; to 10, Oct.; 12, Nov., and 15, Dec.

1834.—In Jan., 15 to 24 per cent; then high and variable, and fell in Dec. from 10 to 8 per cent. Called a "panic year."

1835.—Rates low, and down to 5 per cent; but closed in Dec. at 8 to 10. Called the "golden year" for business.

1836.—Opened at 10 per cent; up to 12 in March; 15, April; 18, May; up to 24, Aug. and Sept.; 36, Oct., and 24 to 30, Nov. and Dec.

1837.—Opened at 16 per cent; advanced to 20, and receded to 13; up to 18 in Feb.; 27, March; 30, April; 32, May; then fell rapidly to 6 in June; advanced to $7\frac{1}{2}$; fell to 6 in Nov., and rose to 10 in Dec. Banks suspended May 10; resumed May, 1838.

1838.—Jan., 11 per cent; Feb., 12; March and April, 12 to 18; fell in May from 10 to 7; thence, 6 to 7 till Dec., and closed at 7 to 9 per cent.

1839.—Opened at 6 to 9, and stationary till July, when it advanced to 11 and 12; in Aug. to 15; Sept. to 21; Oct. to 30; Nov. to 36, and then rapidly fell to 9 per cent at the close of year.

1840.—Jan., 9 per cent; Feb. and March, 9 to 12, and fell in April to 7; May, 7; June, 6 to 8; July, fell to 5, and ranged at 6 to 7 for remainder of the year.

1841.—At 6 to 7 per cent till May; then 6 till Sept., and $6\frac{1}{2}$ to 7, up to 9, in Nov., and 9 to 12 in Dec.

1842.—At 9 to 12 till April; then 8 to Aug.; Sept., 7; declined to 6 in Oct. and Nov., and thence 6 to 9 per cent to close of year.

1843.—Opened at 6 per cent; then 5 to 6 till May; declined in May to $4\frac{1}{2}$, and 3 in June; "exceptional loans" made as low as $2\frac{1}{2}$; thence $3\frac{1}{2}$ to 4 per cent.

1844.—Opened at 4 per cent; rose to 5 in March, and remained for the year with little change from 5 per cent.

1845.—Opened at 5 per cent, and ranged from 5 to 6 till Aug., and rose to 8 in Nov. and Dec.

1846.—Opened at 8 per cent; rose to 9 in Feb.; declined to 7 in March; thence ranged from 8 and 9 to 12, up to Aug. In Aug., 8 to 9; declined to 6 in Sept.; thence 6, 7, and 8 per cent.

1847.—Opened at 8 per cent; advanced to 12 in Jan. and Feb.; 8 to 10 in March; fell to 6 in June; advanced to 9 and 12 in Oct.; 15 in Nov., and 18 in Dec.

1848.—Jan., 18 per cent; Feb., 18 to 12; March and April, 12 to 15; May and June, 15 to 18; July and Aug., 12 to 15; Oct., 18; Nov., 18 to 15; Dec., 15 to 12.

1849.—Jan., 12 per cent; Feb., 9 to 12; March and April, 12 to 15; May, 9 to 11; declined to 7 in June; July, 8; Aug., $7\frac{1}{2}$ to $8\frac{1}{2}$; Sept., 9; Oct., 9 to 10, reaching $10\frac{1}{2}$ in Dec.

1850.—Jan., 9 to $10\frac{1}{2}$ per cent; Feb. and March, receded to 8 and 9; April, May, and June, 7 to $8\frac{1}{2}$; fell to $6\frac{1}{2}$ in July; rose to 9 in Sept.; thence, 7 to 8 per cent.

1851.—Opened at 6 to $7\frac{1}{2}$ per cent; advanced to 7 and $8\frac{1}{2}$ in Feb. and March; April, 8; fell to $6\frac{1}{2}$ in May, and rose to 11 in July and Aug.; 15 in Sept.; and 16, Oct.; thence 9 to 12 per cent.

1852.—Opened at 9 per cent; fell to $7\frac{1}{4}$ in Feb.; March, April and May, 6, and $5\frac{1}{2}$ the Summer months. In Sept., 6 to 7; thence, 6 per cent.

1853.—Opened at 6 per cent; advanced to 8, and gradually to 12 in March; fell to 8 in May; then at 9 to 10 in June and July; rose to 12 in Sept.; 15, Oct.; 18, Nov., and fell to 9, Dec.

1854.—Opened at 9 per cent; fell to 7 in Feb.; rose to 10 in March, and 12, April and May; fell to 9 in June; July, 9 to 10; Aug., 12; and 10 to 12, up to 18, in Dec.

1855.—Opened at 15 per cent; fell to 10, and in March to 7; rose to 10 in April; fell to $6\frac{1}{2}$, May; up to 8, and fluctuated from 6 to 8, till Oct.; in Oct., 9, and thence 10 to 15 per cent.

1856.—Opened at 10 to 12 per cent; Feb., 9 to 10; March, 7 to 9; thence till Nov. at 9 to 10, and in Dec., 10 to 11 per cent.

1857.—Opened at 9 to 10 per cent; Feb., $8\frac{1}{2}$ to 9; March, 9 to 10, and fell to 7 and 8 in April and May; June, July, Aug., 9 to 10, and rose in Sept. from 12 to 36; Oct., 24 to 36; Nov., 15 to 24; Dec., 9 to 15. Banks suspended Oct. 13, and resumed Dec. 12.

1858.—Jan., $7\frac{1}{2}$ to 9 per cent; fell to $5\frac{1}{2}$ in Feb., to 5 in March, and $4\frac{1}{2}$ in April; thence, $4\frac{1}{2}$ to 4 in Sept. In Aug., "call loans" reported at $2\frac{1}{2}$ in New York, and leading bankers said to be purchasing their own paper at two per cent. Prominent sixty days' acceptances passed at 3 per cent. Oct. and Nov., 4; Dec., 5 per cent.

1859.—Jan., 5 to 6 per cent; Feb., March, and April, $5\frac{1}{2}$ to 7; May, $6\frac{1}{2}$ to 8; June to Nov., 7 to 8; Dec., 7 to $8\frac{1}{2}$ per cent.

1860.—Jan. and Feb., $7\frac{1}{2}$ to $9\frac{1}{2}$ per cent; March, 6 to 8; April and May, 6 to 7; June, 5 to 7; July, 5 to $6\frac{1}{2}$; Aug., 6 to 9; Sept., $6\frac{1}{2}$ to 9; Oct., $6\frac{1}{2}$ to $7\frac{1}{2}$; Nov., 7 to 15; Dec., 12 to 18 per cent; the money market being disturbed by the Government as a constant borrower, and the threatening aspect of political matters South.

TABLE 25

COMMERCIAL PAPER RATES IN BOSTON MONTHLY 1831-1860

(From Erastus B. Bigelow's *The Tariff Question* Appendix Table No. 112. Bigelow describes these rates as "street rates on first class paper in Boston. . . . at the beginning, middle, and end of the month." Both figures and comments are Bigelow's.)

1831			1834				1838		
J	5 1/2		S				M	12	18
F	5 1/2		O				A	18	12
M	5 1/2		N				M	10	9
A	5 1/2		D	12	10	8	J	7	6
M	5 1/2						J		6
J	5 1/2		1835				A	6	7
J	6		J	Rates comparatively low		5	S	6	7
A	6 1/2		F				O	6	7
S	7		M				N	6	8
O	7		A				D	7	9
N	7		M						
D	7		J				1839		
			J				J	6	9
1832			A				F	6	9
J	7		S				M	6	9
F	6 1/2		O				A	6	9
M	6		N				M	6	9
A	6 1/2		D		8	10	J		9
M	7						J	11	12
J	6		1836				A	12	15
J	6		J			10	S	15	18
A	6		F			10	O	21	30
S	6		M			12	N	20	33
O	6		A		12	15	D	18	15
N	6		M		15	18			9
D	6		J		15	12	1840		
			J		15	18	J		9
1833			A		18	24	F	9	12
J	6		S			24	M	9	12
F	5 1/2		O		24	36	A	12	7
M	5 1/2		N		24	30	M		7
A	6		D		24	30	J	6	8
M	6						J	8	5
J	6 1/2		1837				A	5	7 1/2
J	8		J	16	20	13	S	6	7
A	8		F	15	21	18	O	6	7
S	8		M	18	20	27	N	6	7
O	10		A	27	26	30	D	6	7
N	12	10	M		27	32			
D	15	12	J	18	9	6	1841		
			J			7 1/2	J	6	7
1834			A			7 1/2	F	6	7
J	15	18	S		7 1/2	6 1/2	M	6	7
F		24	O		6	6 1/2	A	6	7
M			N			9	M		6
A			D			10	J		6
M							J		6
J			1838				A		6
J			J			11	S	6	7
A			F			12	O	6	7 1/2

SHORT TERM INTEREST RATES

A249

TABLE 25—(Continued)

1841			1845				1849		
N	6	9	N	6	5½	8	N	8	10
D	9	12	D			8	D	9½	10½
1842			1846				1850		
J	9	12	J			8	J	9	10½
F	9	12	F		8	9	F	9	8
M	9	12	M		8	7	M	8	9
A		8	A		9	12	A	8½	9
M		8	M		8	12	M	7½	8½
J		8	J		8	12	J	7½	8
J		8	J	8	12	9	J	6½	7
A		7¼	A		8	9	A	7	8
S		7	S		9	6	S	7½	9
O	6½		O		6	8	O	7	8
N	6	6½	N		6	7	N	7	8
D	6	9	D		6	7	D	7	8
1843			1847				1851		
J		6	J		8	12	J	6	7½
F	6	5	F		8	12	F	7	8½
M	5	6	M		8	10	M	7	8½
A		5	A		8	9	A		8
M	5	4½	M			8	M	7½	6½
J	5	3½	J		7	6	J	7	9
J		4	J		7	6	J	9	11
A	3¼	4	A		7	9	A		11
S	3½	4	S			9	S	12	15
O	3½	4	O		9	12	O	15	16
N	3½	4	N		12	15	N	9	12
D	3½	4	D		12	18	D	9	12
1844			1848				1852		
J		4	J			18	J	9	8½
F		4	F	18	15	12	F	8½	7½
M	4	5	M		12	15	M	7	6
A		5	A			15	A		6
M		5	M		12	15	M		6
J		5	J		15	18	J	5½	6
J		5	J		15	18	J	5½	6
A		5	A		12	15	A	5½	6
S	5	5½	S		12	15	S	6	7
O		5	O		15	18	O		6
N	5	5½	N		18	15	N		6
D	5	5	D		15	12	D		6
1845			1849				1853		
J	5	6	J			12	J	6	8
F	5½	6	F		9	12	F	9	10
M	5½	6	M		12	15	M	10	12
A	5½	6	A		12	15	A	10½	10
M	5½	6	M		9	11	M	8	9
J	5½	6	J		7	9	J	8	9
J	5¾	6	J			8	J		9
A		6	A		7½	8½	A	9	10
S		6	S			9	S	10	12
O	6	5½	O		9	10	O	12	15

TABLE 25—(Concluded)

1853				1856				1858			
N	15	18	12	M		10	A	4	4	4	
D	12	10	9	A	9	8	S	4	4	4	
				M	7	8	O	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	
1854				J	7	8	N	$4\frac{1}{2}$	$4\frac{1}{2}$	5	
J		9	8	J	7	8	D	5	5	5	
F		7	9	A	7	8					
M	9	8	10	S	8	9					
A		10	12	O	9	10	1859	5	5	$5\frac{1}{2}$	
M		9	12	N	9	10	J	$5\frac{1}{2}$	6	6	
J		10	11	D	10	11	F	6	$5\frac{1}{2}$	$5\frac{1}{2}$	
A		10	9				M	$5\frac{1}{2}$	$5\frac{1}{2}$	$5\frac{1}{2}$	
S		10	9	1857			A	6	$6\frac{1}{4}$	$6\frac{1}{4}$	
O		12	10	J	9	10	M	7	8	7	
N		10	12	F	$8\frac{1}{2}$	9	J	7	$6\frac{1}{2}$	7	
D		12	18	M	$9\frac{1}{2}$	10	A	$7\frac{1}{4}$	7	7	
				A	8	9	S	$6\frac{3}{4}$	7	$7\frac{1}{2}$	
1855				M	8	7	O	$7\frac{1}{4}$	$7\frac{1}{2}$	$7\frac{1}{2}$	
J				J	7	8	N	$7\frac{1}{2}$	7	7	
F	15	10	10	A	9	10	D	7	8	8	
M		7	9	S	12	24					
A		8	10	O	36	24	1860	8	9	$8\frac{1}{2}$	
M		$6\frac{1}{2}$	8	N	24	18	J	8	7	$6\frac{1}{2}$	
J		7	6	D	15	12	F	6	6	5	
J		6	7				M	5	6	$4\frac{3}{4}$	
A		7	8	1858			A	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	
S		7	8	J	9	8	M	$4\frac{1}{2}$	5	$5\frac{1}{2}$	
O		$7\frac{1}{2}$	12	F	6	$5\frac{1}{2}$	J	$5\frac{1}{2}$	$5\frac{1}{2}$	6	
N	10	12	15	M	$5\frac{1}{2}$	$5\frac{1}{2}$	A	6	6	6	
D	12			A	5	5	S	6	$5\frac{1}{2}$	$5\frac{1}{2}$	
				M	$4\frac{1}{2}$	$4\frac{1}{2}$	O	$5\frac{1}{2}$	$5\frac{1}{2}$	6	
1856				J	$4\frac{1}{2}$	$4\frac{1}{2}$	N	6	9	12	
J		10	12	J	$4\frac{1}{2}$	$4\frac{1}{2}$	D	15	15	12	
F		10	9	J	$4\frac{1}{2}$	$4\frac{1}{2}$					

SHORT TERM INTEREST RATES

A251

TABLE 26

AVERAGE MONTHLY¹ RATE ON 90-DAY PRIME BANKERS' ACCEPTANCES

	1918 ²	1921	1924	1927	1930	1933
J	4.00	5.94	4.09	3.69	3.96	.33
F	4.12	5.97	4.07	3.69	3.77	.47
M	4.25	5.98	4.04	3.63	3.07	2.49
A	4.25	5.67	3.95	3.63	2.91	.81
M	4.25	5.69	3.29	3.63	2.48	.50
J	4.25	5.59	2.45	3.63	2.09	.38
J	4.25	5.25	2.01	3.50	1.88	.48
A	4.25	5.00	2.10	3.13	1.88	.45
S	4.25	4.94	2.33	3.13	1.88	.25
O	4.31	4.49	2.21	3.25	1.88	.25
N	4.31	4.27	2.37	3.25	1.88	.39
D	4.31	4.16	2.89	3.25	1.88	.62
	1919	1922	1925	1928	1931	1934
J	4.25	3.95	3.00	3.36	1.58	.50
F	4.25	4.00	3.08	3.51	1.39	.50
M	4.25	3.73	3.25	3.52	1.50	.31
A	4.25	3.32	3.14	3.81	1.43	.20
M	4.25	3.18	3.17	3.94	1.01	.19
J	4.25	3.07	3.25	4.05	.88	.19
J	4.26	3.00	3.25	4.32	.88	.19
A	4.28	3.00	3.27	4.62	.88	.19
S	4.25	3.12	3.50	4.50	.98	.19
O	4.25	3.72	3.50	4.50	2.47	.17
N	4.52	4.00	3.50	4.50	2.99	.13
D	4.95	4.00	3.50	4.50	3.00	.13
	1920	1923	1926	1929	1932	1935
J	5.37	3.98	3.67	4.84	2.85	.13
F	5.50	3.99	3.63	5.15	2.78	.13
M	6.00	4.00	3.63	5.34	2.51	.13
A	6.00	4.14	3.42	5.46	1.39	.13
M	6.13	4.13	3.20	5.48	.92	.13
J	6.25	4.13	3.32	5.49	.86	.13
J	6.25	4.13	3.38	5.16	.75	.13
A	6.25	4.13	3.57	5.13	.75	.13
S	6.25	4.13	3.88	5.13	.75	.13
O	6.25	4.13	3.88	5.01	.59	.13
N	6.23	4.13	3.79	4.23	.50	.13
D	6.25	4.13	3.83	3.90	.39	.13

¹These rates are monthly averages of daily quotations for the month.

²Rates for 1918 are 'Prevailing Rates' calculated at the Federal Reserve Bank of New York. Monthly averages of daily quotations are not available before January 1919.

TABLE 27

BANK CLEARINGS, PIG IRON PRODUCTION AND WHOLESALE PRICES

PART I

Bank Clearings in New York City, October 1853-December 1874
(daily averages—thousands of dollars)

PART II

Col. 1 Bank Clearings in New York City, January 1875-January 1919;
Bank Debits in New York City, January 1919-January 1937
(daily averages—thousands of dollars)

Col. 2 Deflated¹ Bank Clearings Outside New York City, January
1875-January 1919; Deflated Bank Debits for 140 Outside
Cities, January 1919-January 1937 (daily averages—thou-
sands of dollars)

Col. 3 Bank Clearings Outside New York City,² January 1875-January
1919; Bank Debits for 140 Outside Cities, January 1919-
January 1937 (daily averages—thousands of dollars)

Col. 4 Pig Iron Production in the United States,³ January 1877-January
1937 (daily averages—thousands of gross tons)

Col. 5 Carl Snyder's Index of General Price Level, January 1875-
January 1937

Col. 6 United States Bureau of Labor Statistics Index Number of
Wholesale Prices of Commodities, January 1890-January 1937.

¹Deflated by Carl Snyder's index of general price level.

²Estimated by chaining monthly totals, making the percentage movement from each December to the immediately succeeding January be the same as the percentage movement of the totals of the largest number of cities whose clearings were available for the December and the January.

³These figures do not include charcoal pig iron. Monthly figures for 1877-September 1901 were estimated from weekly capacity of furnaces in blast.

BANK CLEARINGS, PIG IRON AND PRICES A253

TABLE 27

PART I

BANK CLEARINGS IN NEW YORK CITY

1853		1857		1861	
J		J	21,854	J	16,962
F		F	23,769	F	17,009
M		M	24,221	M	17,104
A		A	25,509	A	17,467
M		M	24,856	M	14,239
J		J	23,996	J	12,273
J		J	23,506	J	12,837
A		A	21,573	A	11,861
S		S	16,062	S	12,864
O	11,381	O	9,954	O	16,646
N	15,688	N	10,716	N	16,615
D	15,530	D	10,878	D	15,823
1854		1858		1862	
J	15,008	J	11,057	J	14,546
F	16,008	F	12,731	F	15,601
M	17,095	M	14,851	M	15,861
A	17,064	A	14,707	A	17,197
M	18,742	M	15,206	M	22,539
J	17,579	J	14,502	J	22,052
J	15,137	J	13,917	J	23,088
A	14,789	A	13,455	A	20,257
S	15,139	S	14,452	S	25,537
O	15,451	O	16,896	O	34,888
N	14,904	N	17,850	N	29,215
D	13,773	D	17,015	D	29,793
1855		1859		1863	
J	13,781	J	16,548	J	39,869
F	13,681	F	17,682	F	42,832
M	17,623	M	18,872	M	42,155
A	14,711	A	20,382	A	39,581
M	15,744	M	20,170	M	49,291
J	15,507	J	17,171	J	40,785
J	14,150	J	15,596	J	40,645
A	14,750	A	15,968	A	44,491
S	15,425	S	17,926	S	52,850
O	17,971	O	18,619	O	62,167
N	18,457	N	19,226	N	58,950
D	17,838	D	18,826	D	57,202
1856		1860		1864	
J	17,556	J	18,952	J	57,107
F	18,764	F	18,936	F	72,006
M	17,981	M	21,149	M	88,817
A	20,114	A	20,963	A	88,158
M	21,452	M	21,809	M	60,569
J	18,923	J	19,222	J	63,401
J	19,244	J	18,910	J	57,347
A	17,667	A	19,909	A	57,291
S	20,520	S	20,541	S	69,425
O	22,643	O	24,221	O	68,531
N	23,167	N	22,163	N	80,632
D	22,822	D	15,304	D	78,189

TABLE 27—(Continued)

PART I

BANK CLEARINGS IN NEW YORK CITY

1865		1869		1873	
J	83,596	J	90,562	J	102,428
F	77,356	F	92,818	F	113,816
M	78,351	M	106,585	M	106,062
A	51,010	A	112,583	A	109,517
M	70,397	M	116,750	M	89,665
J	67,842	J	115,208	J	76,648
J	68,809	J	97,592	J	76,901
A	66,225	A	81,659	A	66,704
S	61,827	S	111,103	S	78,598
O	82,425	O	83,277	O	50,130
N	75,193	N	83,504	N	49,927
D	63,932	D	77,455	D	63,357
1866		1870		1874	
J	76,722	J	76,236	J	73,673
F	71,126	F	72,649	F	65,797
M	82,195	M	76,204	M	68,211
A	79,092	A	73,624	A	73,658
M	87,979	M	88,642	M	64,952
J	87,981	J	76,820	J	66,368
J	74,395	J	82,921	J	61,424
A	81,571	A	60,438	A	50,268
S	81,060	S	61,718	S	64,075
O	111,500	O	69,871	O	73,286
N	115,803	N	71,004	N	69,343
D	81,344	D	79,787	D	72,844
1867		1871			
J	78,541	J	73,603		
F	67,325	F	69,115		
M	68,338	M	90,485		
A	70,713	A	100,267		
M	71,544	M	94,817		
J	64,479	J	93,915		
J	71,823	J	63,393		
A	62,936	A	67,489		
S	74,780	S	89,585		
O	79,783	O	96,795		
N	73,078	N	78,987		
D	64,927	D	88,429		
1868		1872			
J	82,613	J	97,114		
F	82,665	F	84,854		
M	87,106	M	100,196		
A	83,275	A	118,178		
M	73,314	M	109,595		
J	81,547	J	83,210		
J	73,268	J	72,241		
A	75,138	A	86,032		
S	77,647	S	93,664		
O	109,223	O	125,061		
N	106,118	N	113,184		
D	89,817	D	108,528		

BANK CLEARINGS, PIG IRON AND PRICES A255

TABLE 27—(Continued)

PART II

Date	1 Clear. N. Y.	2 Def. Cl. outs. N. Y.	3 Clear. outs. N. Y.	4 Pig Iron	5 Snyder's Prices	6 B. of L. Prices
1875						
J	74,771	33,118	30,800	.....	93	.....
F	69,180	31,447	29,246	.....	93	.....
M	73,398	35,643	33,148	.....	93	.....
A	75,580	32,452	30,180	.....	93	.....
M	70,667	31,736	29,197	.....	92	.....
J	71,148	36,340	33,433	.....	92	.....
J	63,997	30,553	27,803	.....	91	.....
A	50,041	31,793	28,932	.....	91	.....
S	59,765	29,520	26,863	.....	91	.....
O	62,576	33,043	29,739	.....	90	.....
N	63,700	39,970	35,573	.....	89	.....
D	64,903	33,113	29,471	.....	89	.....
1876						
J	65,211	35,727	31,797	.....	89	.....
F	65,210	32,433	28,541	.....	88	.....
M	62,152	36,067	31,739	.....	88	.....
A	55,490	30,394	26,747	.....	88	.....
M	57,309	32,369	28,161	.....	87	.....
J	55,075	34,583	30,087	.....	87	.....
J	48,948	30,041	25,835	.....	86	.....
A	50,461	32,292	27,771	.....	86	.....
S	57,329	30,267	26,030	.....	86	.....
O	65,040	33,709	28,990	.....	86	.....
N	59,195	36,992	31,813	.....	86	.....
D	62,908	34,576	29,735	.....	86	.....
1877						
J	68,563	34,241	29,790	4.71	87	.....
F	69,556	32,691	28,114	4.78	86	.....
M	63,897	33,586	28,548	4.83	85	.....
A	68,174	31,282	26,590	4.85	85	.....
M	63,720	35,373	29,713	4.80	84	.....
J	61,244	29,889	25,107	4.72	84	.....
J	60,332	29,831	25,058	4.70	84	.....
A	61,868	30,215	25,381	4.74	84	.....
S	61,571	31,301	25,980	4.84	83	.....
O	73,369	35,029	29,074	5.00	83	.....
N	64,647	37,622	30,850	5.20	82	.....
D	65,800	34,107	27,968	5.43	82	.....
1878						
J	64,971	39,237	32,174	5.70	82	.....
F	53,924	30,962	25,079	5.90	81	.....
M	59,963	29,175	23,632	5.98	81	.....
A	67,364	30,272	24,520	5.90	81	.....
M	60,646	32,790	26,232	5.76	80	.....
J	57,211	29,796	23,837	5.63	80	.....
J	59,666	33,359	26,687	5.45	80	.....
A	56,542	28,121	22,497	5.32	80	.....
S	55,074	31,966	25,573	5.25	80	.....
O	71,310	38,730	30,984	5.32	80	.....
N	67,841	33,725	26,980	5.40	80	.....
D	61,307	32,625	25,774	5.47	79	.....

TABLE 27—(Continued)

PART II

Date	1 Clear. N. Y.	2 Def. Cl. outs. N. Y.	3 Clear. outs. N. Y.	4 Pig Iron	5 Snyder's Prices	6 B. of L. Prices
1879						
J	70,985	37,208	29,394	5.51	79	.....
F	68,296	34,001	26,861	5.54	79	.....
M	60,536	31,658	25,010	5.58	79	.....
A	68,341	37,772	29,840	5.63	79	.....
M	78,898	34,724	27,432	5.74	79	.....
J	63,088	35,392	27,960	5.98	79	.....
J	65,608	38,325	30,277	6.40	79	.....
A	74,290	31,715	25,055	6.84	79	.....
S	76,938	35,541	28,433	7.31	80	.....
O	114,187	50,435	40,348	7.83	80	.....
N	117,142	46,444	37,620	8.33	81	.....
D	101,586	45,099	36,981	8.83	82	.....
1880						
J	104,572	47,898	39,755	9.25	83	.....
F	100,868	43,294	35,934	9.59	83	.....
M	111,972	44,270	37,187	9.75	84	.....
A	112,520	44,925	37,737	9.74	84	.....
M	197,501	41,788	34,684	9.50	83	.....
J	97,803	41,241	34,230	9.07	83	.....
J	83,984	41,228	34,219	8.60	83	.....
A	77,412	39,239	32,568	8.45	83	.....
S	89,841	40,735	34,217	8.60	84	.....
O	104,520	45,350	38,094	8.89	84	.....
N	135,766	51,354	43,137	9.15	84	.....
D	139,434	53,111	44,613	9.42	84	.....
1881						
J	152,117	51,359	43,655	9.71	85	.....
F	155,453	49,214	41,832	9.93	85	.....
M	135,559	47,154	40,081	10.03	85	.....
A	123,535	49,208	41,827	9.97	85	.....
M	157,457	52,516	44,639	9.80	85	.....
J	140,538	58,156	49,433	9.64	85	.....
J	125,335	47,002	39,952	9.49	85	.....
A	114,704	52,779	45,390	9.44	86	.....
S	113,833	53,860	46,320	9.54	86	.....
O	138,106	58,821	51,174	9.69	87	.....
N	129,956	56,920	49,520	9.95	87	.....
D	137,633	53,940	48,968	10.36	86	.....
1882						
J	139,159	53,852	46,313	10.98	86	.....
F	126,737	49,543	42,607	11.34	86	.....
M	143,956	49,033	42,168	11.25	86	.....
A	130,254	50,663	43,570	11.03	86	.....
M	103,850	50,386	43,332	10.80	86	.....
J	111,563	51,453	44,250	10.57	86	.....
J	114,336	51,001	43,861	10.30	86	.....
A	120,181	48,357	41,587	10.24	86	.....
S	134,573	52,872	45,470	10.48	86	.....
O	141,412	56,144	48,284	11.15	86	.....
N	151,038	58,267	49,527	11.56	85	.....
D	125,641	54,744	46,532	11.83	85	.....

BANK CLEARINGS, PIG IRON AND PRICES A257

TABLE 27—(Continued)

PART II

Date	1 Clear. N. Y.	2 Def. Cl. outs. N. Y.	3 Clear. outs. N. Y.	4 Pig Iron	5 Snyder's Prices	6 B. of L. Prices
1883						
J	106,738	56,626	48,132	12.00	85	.....
F	107,058	52,008	44,207	12.02	85	.....
M	99,838	51,799	44,029	11.88	85	.....
A	102,846	50,768	43,153	11.49	85	.....
M	103,388	53,818	45,745	11.18	85	.....
J	100,401	55,964	47,010	11.08	84	.....
J	88,881	52,281	43,916	11.04	84	.....
A	96,168	50,517	41,929	10.98	83	.....
S	101,400	51,590	42,820	10.92	83	.....
O	123,604	59,316	49,232	10.77	83	.....
N	96,329	56,880	47,210	10.62	83	.....
D	104,202	57,188	46,894	10.38	82	.....
1884						
J	109,125	57,041	46,774	9.94	82	.....
F	102,336	51,720	42,410	9.67	82	.....
M	92,747	50,860	41,197	9.82	81	.....
A	96,744	55,675	45,097	10.22	81	.....
M	107,394	56,030	45,384	10.45	81	.....
J	79,890	49,163	39,330	10.59	80	.....
J	70,320	48,258	38,606	10.74	80	.....
A	66,122	44,210	35,368	10.23	80	.....
S	68,549	47,159	37,727	9.85	80	.....
O	76,479	53,246	42,597	9.90	80	.....
N	69,864	49,801	39,343	10.09	79	.....
D	76,739	54,324	42,916	9.44	79	.....
1885						
J	70,496	53,765	42,474	9.05	79	.....
F	67,864	46,392	36,650	9.80	79	.....
M	64,928	46,570	36,790	10.10	79	.....
A	62,266	50,895	40,207	9.90	79	.....
M	64,446	48,371	37,729	9.71	78	.....
J	64,077	52,667	41,080	9.60	78	.....
J	76,648	53,127	41,439	9.84	78	.....
A	65,842	45,827	35,745	9.90	78	.....
S	70,048	50,747	39,583	9.80	78	.....
O	102,895	60,363	47,687	10.23	79	.....
N	110,632	61,570	48,640	11.20	79	.....
D	104,464	62,319	49,232	12.10	79	.....
1886						
J	92,759	58,358	46,103	12.19	79	.....
F	98,054	56,171	44,375	11.96	79	.....
M	93,712	58,310	46,065	12.81	79	.....
A	80,699	56,532	44,660	14.23	79	.....
M	77,753	55,399	43,765	15.03	79	.....
J	91,139	60,772	48,010	15.30	79	.....
J	79,872	60,820	48,048	15.13	79	.....
A	79,167	55,027	43,471	14.78	79	.....
S	86,860	59,751	47,203	14.88	79	.....
O	104,784	66,432	52,481	15.39	79	.....
N	106,065	69,384	54,813	15.63	79	.....
D	116,741	70,473	55,674	15.84	79	.....

TABLE 27—(Continued)

PART II

Date	1 Clear. N. Y.	2 Def. Cl. outs. N. Y.	3 Clear. outs. N. Y.	4 Pig Iron	5 Snyder's Prices	6 B. of L. Prices
1887						
J	95,571	65,426	51,032	16.26	78	.....
F	88,331	62,738	48,936	16.54	78	.....
M	91,495	68,673	54,252	16.71	79	.....
A	101,096	70,228	55,480	17.03	79	.....
M	90,024	69,306	54,752	14.65	79	.....
J	98,848	75,744	59,080	12.13	78	.....
J	83,717	66,468	51,845	12.97	78	.....
A	80,449	62,754	48,948	15.42	78	.....
S	89,429	67,017	52,273	17.57	78	.....
O	96,095	72,486	56,539	18.35	78	.....
N	97,727	75,785	59,870	18.47	79	.....
D	88,399	70,984	56,077	17.97	79	.....
1888						
J	81,328	68,334	53,984	13.26	79	.....
F	73,333	65,216	51,521	14.59	79	.....
M	76,967	63,148	49,887	14.48	79	.....
A	85,745	67,185	53,077	15.17	79	.....
M	87,969	70,000	55,309	15.61	79	.....
J	78,544	69,199	54,667	15.23	79	.....
J	75,622	66,982	52,916	15.19	79	.....
A	77,828	64,451	51,561	16.00	80	.....
S	89,313	66,571	53,257	16.70	80	.....
O	103,043	82,181	65,745	17.58	80	.....
N	90,541	76,075	60,860	18.73	80	.....
D	93,023	75,875	60,700	19.65	80	.....
1889						
J	99,023	77,270	61,816	19.55	80	.....
F	96,258	72,116	57,693	19.18	80	.....
M	93,218	71,056	53,845	19.23	80	.....
A	91,667	72,484	57,987	18.77	80	.....
M	99,364	75,456	60,365	17.94	80	.....
J	102,379	74,654	59,723	17.67	80	.....
J	93,699	76,504	61,203	18.03	80	.....
A	88,660	68,678	54,942	18.18	80	.....
S	89,996	70,521	56,417	18.75	80	.....
O	116,702	85,908	68,726	20.18	80	.....
N	106,803	83,534	66,827	21.43	80	.....
D	102,062	81,243	64,994	22.16	80	.....
1890						
J	105,625	85,823	68,658	22.67	80	54.7
F	100,767	78,139	62,511	23.23	80	54.8
M	91,062	78,649	62,919	23.77	80	55.0
A	97,453	85,250	68,200	24.02	80	55.1
M	122,211	91,460	73,168	24.24	80	55.6
J	105,288	83,621	69,297	23.92	80	55.4
J	91,392	86,399	69,119	22.94	80	55.7
A	95,488	79,476	63,581	22.65	80	57.8
S	103,067	85,066	68,053	23.49	80	58.4
O	115,050	97,113	77,690	23.85	80	58.1
N	111,699	93,275	73,687	24.07	79	57.1
D	92,499	83,913	68,661	23.07	79	56.6

BANK CLEARINGS, PIG IRON AND PRICES A259

TABLE 27—(Continued)

PART II

Date	1 Clear. N. Y.	2 Def. Cl. outs. N. Y.	3 Clear. outs. N. Y.	4 Pig Iron	5 Snyder's Prices	6 B. of L. Prices
1891						
J	95,387	87,039	68,761	19.95	79	56.1
F	82,305	79,986	63,189	17.37	79	56.6
M	78,907	77,419	61,161	15.09	79	57.8
A	96,530	85,616	67,637	13.92	79	58.2
M	93,766	82,405	65,100	16.24	79	57.5
J	84,850	83,086	64,807	20.53	78	55.8
J	79,939	83,954	65,484	23.04	78	55.5
A	77,532	77,945	60,797	23.55	78	55.4
S	110,750	89,769	70,020	24.56	78	54.8
O	105,874	95,830	75,706	25.93	79	54.6
N	98,276	92,958	72,507	26.49	78	54.3
D	105,130	92,809	73,319	26.28	79	53.8
1892						
J	114,471	91,078	71,952	25.81	79	52.7
F	111,637	91,096	71,966	25.86	79	52.4
M	105,182	87,958	69,487	25.55	79	51.6
A	102,517	89,848	70,980	24.47	79	50.5
M	96,134	88,584	69,981	23.42	79	50.8
J	93,568	94,971	75,027	22.93	79	50.7
J	83,173	89,020	70,326	22.07	79	51.9
A	81,749	86,268	68,152	20.99	79	52.4
S	92,616	90,794	71,727	21.20	79	52.5
O	99,306	101,249	79,987	22.62	79	53.0
N	106,041	103,667	81,897	23.84	79	54.0
D	116,202	104,324	82,416	23.95	79	55.0
1893						
J	114,886	102,532	81,000	23.54	79	56.6
F	109,532	95,710	75,611	23.76	79	57.2
M	104,861	94,301	73,555	24.33	78	56.2
A	93,545	96,368	75,167	24.70	78	55.6
M	98,564	97,973	75,439	24.45	77	55.0
J	87,530	87,658	67,497	22.57	77	53.2
J	77,207	78,514	59,671	17.95	76	51.9
A	63,162	62,542	47,532	13.01	76	50.3
S	61,373	68,825	52,307	10.65	76	52.0
O	71,915	80,568	61,232	10.49	76	52.9
N	75,228	84,991	64,593	12.45	76	51.2
D	71,466	84,099	63,074	13.99	75	50.4
1894						
J	69,857	85,088	63,816	14.16	75	49.6
F	61,573	73,891	55,418	15.10	75	48.6
M	66,090	76,847	57,635	17.20	75	47.5
A	67,278	79,343	59,507	17.21	75	47.3
M	67,521	82,250	60,865	12.44	74	47.0
J	63,286	80,383	59,487	10.61	74	47.2
J	59,465	76,386	56,526	14.43	74	47.5
A	60,374	77,323	57,219	19.11	74	48.3
S	62,168	78,328	57,963	21.56	74	49.6
O	73,597	91,639	67,813	22.36	74	48.2
N	74,716	91,104	67,417	23.50	74	47.9
D	75,365	90,288	66,813	23.70	74	47.5

TABLE 27—(Continued)

PART II

Date	1 Clear. N. Y.	2 Def. Cl. outs. N. Y.	3 Clear. outs. N. Y.	4 Pig Iron	5 Snyder's Prices	6 B. of L. Prices
1895						
J	77,248	91,809	67,939	23.09	74	47.2
F	66,587	78,118	57,807	22.14	74	46.9
M	72,282	82,009	60,687	21.62	74	47.2
A	79,116	88,923	65,803	21.45	74	49.6
M	91,415	91,325	68,494	21.35	75	50.1
J	82,695	89,284	66,963	22.44	75	50.4
J	81,538	91,815	68,861	24.31	75	50.0
A	74,736	82,172	61,629	26.47	75	49.5
S	79,100	84,013	63,010	28.35	75	49.0
O	94,633	103,901	77,926	30.12	75	49.4
N	86,440	100,036	75,027	31.21	75	49.0
D	93,868	99,011	73,268	30.37	74	48.3
1896						
J	82,659	93,418	69,129	28.81	74	48.0
F	81,828	84,278	62,366	27.33	74	47.5
M	74,718	82,750	61,235	26.43	74	46.9
A	79,782	89,239	66,037	26.30	74	46.7
M	75,487	85,972	63,619	25.76	74	46.0
J	80,479	88,405	65,420	24.89	74	45.5
J	80,013	86,990	63,503	22.96	73	45.1
A	63,586	72,992	53,284	19.33	73	45.1
S	68,768	78,178	57,070	16.13	73	45.3
O	84,317	90,166	66,723	15.85	74	46.6
N	89,562	90,347	66,857	18.14	74	48.1
D	85,675	93,409	69,123	20.73	74	47.6
1897						
J	83,527	86,696	64,155	22.36	74	46.7
F	73,040	82,384	60,964	23.24	74	46.3
M	77,004	82,785	61,261	24.07	74	46.3
A	74,992	87,068	64,430	24.30	74	45.8
M	74,682	84,093	62,229	24.12	74	45.5
J	85,718	89,149	65,970	23.71	74	45.0
J	91,417	89,638	66,332	23.40	74	45.3
A	94,738	86,308	63,808	24.78	74	47.1
S	115,078	97,747	73,310	27.18	75	48.5
O	107,614	102,431	76,823	29.22	75	48.1
N	104,048	106,193	78,583	30.80	74	47.9
D	115,754	106,211	79,658	31.59	75	48.1
1898						
J	119,042	103,824	77,868	31.65	75	48.0
F	125,580	100,795	75,596	31.96	75	48.6
M	110,258	99,480	74,610	32.16	75	48.8
A	95,631	98,572	72,943	32.00	74	48.9
M	101,465	98,008	73,506	31.39	75	51.8
J	108,862	103,257	77,443	30.53	75	48.3
J	96,033	91,264	68,448	29.65	75	48.0
A	113,283	93,101	69,826	29.55	75	48.0
S	113,799	96,303	72,227	30.37	75	47.8
O	114,137	107,208	80,406	31.58	75	47.7
N	132,454	114,070	86,693	32.90	76	48.0
D	150,076	119,414	90,755	33.61	76	48.3

BANK CLEARINGS, PIG IRON AND PRICES A261

TABLE 27—(Continued)

PART II

Date	1 Clear. N. Y.	2 Def. Cl. outs. N. Y.	3 Clear. outs. N. Y.	4 Pig Iron	5 Snyder's Prices	6 B. of L. Prices
1899						
J	183,572	121,496	93,552	33.59	77	48.9
F	162,523	116,730	89,882	32.47	77	49.7
M	190,390	122,513	94,335	32.96	77	49.8
A	185,897	119,688	93,357	34.40	78	50.6
M	178,215	120,050	93,639	34.92	78	50.7
J	159,340	120,594	94,063	35.78	78	51.3
J	142,592	113,884	89,968	36.71	79	51.9
A	140,592	108,734	85,900	37.16	79	53.0
S	146,665	116,756	92,237	38.11	79	54.6
O	169,566	128,279	102,623	39.64	80	55.4
N	165,098	127,184	101,747	40.96	80	55.8
D	172,525	125,960	100,768	41.42	80	56.7
1900						
J	150,470	122,067	98,874	41.52	81	57.0
F	140,948	112,814	91,379	41.51	81	57.3
M	155,983	114,353	92,626	40.96	81	57.3
A	157,208	116,744	94,563	41.05	81	57.2
M	144,427	116,130	94,065	41.48	81	56.1
J	129,140	118,300	95,823	40.45	81	55.5
J	114,571	110,832	89,774	36.55	81	55.8
A	102,719	104,694	83,755	32.82	80	55.7
S	105,217	105,909	84,727	31.32	80	56.1
O	147,620	124,799	101,087	30.22	81	55.3
N	190,135	127,796	104,793	30.76	82	55.4
D	191,843	126,928	104,081	33.38	82	55.1
1901						
J	238,745	134,323	110,145	37.43	82	55.2
F	200,843	122,752	100,657	40.42	82	54.7
M	222,157	126,262	103,535	41.14	82	54.5
A	287,896	141,248	115,823	41.75	82	54.4
M	300,820	140,152	116,326	43.00	83	54.1
J	228,693	134,205	111,390	43.65	83	54.1
J	196,191	131,434	109,090	44.10	83	54.5
A	159,017	122,363	101,561	43.42	83	55.4
S	168,238	120,792	100,257	43.67	83	56.1
O	191,952	143,339	118,971	44.59	83	56.1
N	212,271	142,250	119,490	45.40	84	56.6
D	203,735	138,054	115,965	40.85	84	57.7
1902						
J	223,531	147,773	124,129	46.38	84	56.8
F	191,034	132,029	110,904	44.92	84	56.7
M	177,643	133,740	112,342	46.61	84	56.5
A	245,088	146,289	122,883	49.18	84	57.4
M	219,539	140,182	119,155	49.77	85	58.3
J	165,572	131,141	111,470	48.23	85	58.8
J	212,698	140,046	119,039	46.51	85	59.1
A	187,643	122,418	104,055	47.36	85	58.0
S	226,819	135,655	115,307	47.29	85	58.7
O	241,834	149,378	128,465	47.77	86	63.2
N	217,976	141,864	122,003	47.76	86	60.7
D	198,905	143,901	123,755	49.59	86	61.5

TABLE 27—(Continued)

PART II

Date	1 Clear. N. Y.	2 Def. Cl. outs. N. Y.	3 Clear. outs. N. Y.	4 Pig Iron	5 Snyder's Prices	6 B. of L. Prices
1903						
J	231,810	150,210	129,181	47.51	86	62.6
F	187,186	135,944	118,271	49.67	87	62.0
M	193,684	136,129	118,432	51.31	87	60.3
A	198,146	144,663	124,410	53.61	86	60.0
M	179,839	136,384	117,290	55.28	86	59.0
J	191,550	146,183	125,717	55.77	86	59.0
J	192,832	143,623	123,516	49.88	86	58.6
A	150,472	125,337	107,790	50.68	86	58.8
S	143,049	134,520	115,687	51.79	86	59.5
O	168,816	151,763	130,516	45.99	86	58.7
N	153,597	141,659	121,827	34.65	86	58.3
D	177,343	146,163	125,700	27.31	86	58.2
1904						
J	183,598	144,513	124,281	29.80	86	59.7
F	152,752	135,477	116,510	41.67	86	60.7
M	154,967	138,117	118,781	46.82	86	60.5
A	159,688	140,337	120,690	52.04	86	59.3
M	156,221	130,187	111,961	49.58	86	58.5
J	152,350	139,073	119,603	43.19	86	58.4
J	167,560	133,751	115,026	36.16	86	58.5
A	150,181	129,317	111,213	37.83	86	59.2
S	178,490	139,108	119,633	45.26	86	59.8
O	241,189	153,875	133,871	46.94	87	59.9
N	277,922	164,241	142,890	49.55	87	60.7
D	274,224	162,255	142,784	52.13	88	61.1
1905						
J	249,507	154,443	135,910	57.48	88	60.6
F	254,226	146,826	129,207	57.05	88	61.0
M	281,658	157,195	138,332	62.46	88	60.3
A	289,360	157,295	138,420	64.07	88	60.4
M	254,324	156,778	137,965	63.35	88	59.3
J	224,510	158,276	139,283	59.78	88	59.3
J	220,614	149,518	133,071	56.19	89	59.4
A	225,186	145,592	129,577	59.47	89	60.1
S	228,649	152,730	137,457	63.32	90	59.6
O	258,903	168,792	151,913	66.23	90	59.9
N	284,755	174,770	157,293	67.12	90	60.1
D	312,565	174,857	157,371	65.99	90	61.0
1906						
J	362,522	185,831	169,106	66.74	91	61.1
F	297,301	167,673	152,582	68.00	91	60.8
M	270,234	168,852	153,655	69.86	91	60.6
A	284,775	164,238	149,457	69.11	91	61.1
M	283,646	162,088	147,500	67.70	91	61.3
J	260,540	167,069	152,033	65.89	91	61.3
J	234,082	160,174	145,758	64.95	91	59.7
A	284,942	155,491	143,052	62.15	92	61.2
S	277,128	156,533	144,010	65.70	92	61.7
O	301,421	187,801	172,777	70.87	92	62.8
N	286,933	186,151	173,120	72.92	93	63.6
D	297,675	178,566	167,852	72.11	94	64.3

BANK CLEARINGS, PIG IRON AND PRICES A263

TABLE 27—(Continued)

PART II

Date	1 Clear. N. Y.	2 Def. Cl. outs. N. Y.	3 Clear. outs. N. Y.	4 Pig Iron	5 Snyder's Prices	6 B. of L. Prices
1907						
J	310,893	189,914	178,519	71.15	94	64.0
F	261,839	174,377	163,914	73.04	94	64.9
M	308,460	178,648	167,929	71.82	94	64.3
A	255,584	180,926	170,070	73.89	94	64.5
M	236,608	177,814	167,145	74.05	94	65.6
J	212,306	173,539	163,127	74.49	94	66.1
J	235,864	177,410	166,765	72.76	94	66.1
A	222,274	163,665	153,845	72.59	94	66.1
S	201,008	164,574	154,700	72.78	94	66.5
O	264,387	198,758	184,845	75.39	93	66.9
N	183,358	154,688	142,313	60.94	92	64.6
D	172,579	145,908	134,235	39.82	92	63.2
1908						
J	217,751	165,060	151,855	33.72	92	62.3
F	168,829	147,740	135,921	37.16	92	61.4
M	177,453	154,757	140,829	39.62	91	61.8
A	182,919	158,232	145,573	38.32	92	62.2
M	215,156	149,902	137,910	37.60	92	62.2
J	188,462	155,942	141,907	36.40	91	62.6
J	213,486	161,148	146,645	39.29	91	63.1
A	200,811	144,004	132,484	43.87	92	63.0
S	226,083	160,141	147,330	47.30	92	63.3
O	233,364	175,375	161,345	50.56	92	63.5
N	273,034	177,040	162,877	52.60	92	64.1
D	298,912	181,117	168,439	56.16	93	64.8
1909						
J	286,590	181,769	169,045	57.99	93	64.6
F	245,961	170,269	158,350	60.98	93	64.9
M	241,510	180,673	168,026	59.10	93	65.2
A	287,158	184,534	171,617	57.96	93	66.2
M	261,169	170,868	160,616	60.75	94	67.3
J	303,723	181,359	170,477	64.36	94	67.8
J	268,379	179,183	168,432	67.85	94	67.9
A	280,208	167,879	157,806	72.55	94	68.2
S	282,612	180,161	171,153	79.51	95	68.9
O	324,269	200,371	190,352	83.86	95	70.2
N	302,121	201,479	193,420	84.92	96	70.9
D	319,572	203,105	194,981	85.02	96	71.6
1910						
J	362,874	200,649	192,623	84.15	96	71.4
F	291,112	186,801	179,329	85.62	96	71.3
M	291,812	201,330	195,290	84.45	97	72.9
A	278,059	197,512	191,587	82.79	97	73.2
M	251,834	180,013	174,613	77.10	97	72.0
J	278,811	189,677	183,987	75.52	97	71.0
J	254,151	184,005	176,645	69.31	96	71.0
A	208,460	170,079	164,977	67.96	97	70.8
S	207,701	178,835	173,470	68.54	97	69.9
O	254,971	198,460	192,506	67.52	97	67.9
N	260,477	201,446	195,403	63.66	97	66.4
D	258,865	201,082	193,039	57.35	96	66.6

TABLE 27—(Continued)

PART II

Date	1 Clear. N. Y.	2 Def. Cl. outs. N. Y.	3 Clear. outs. N. Y.	4 Pig Iron	5 Snyder's Prices	6 B. of L. Prices
1911						
J	275,202	201,371	193,316	56.75	96	66.1
F	260,541	184,068	178,546	64.09	97	64.4
M	245,858	195,518	189,652	70.04	97	64.7
A	232,328	189,604	182,020	68.80	96	63.3
M	256,730	187,950	180,432	61.08	96	63.0
J	273,884	193,972	188,153	59.59	97	63.0
J	242,446	185,594	180,026	57.84	97	63.9
A	238,199	176,405	171,113	62.15	97	65.5
S	239,499	187,209	181,593	66.57	97	66.1
O	242,265	200,389	196,381	67.81	98	66.2
N	269,129	206,020	201,900	66.65	98	65.9
D	261,671	202,232	198,187	65.91	98	65.3
1912						
J	285,019	207,667	205,590	66.38	99	66.0
F	252,161	197,917	195,938	72.44	99	66.7
M	271,514	200,104	198,103	77.59	99	67.5
A	294,339	208,267	208,267	79.18	100	69.7
M	283,219	198,184	198,184	81.05	100	70.0
J	265,369	192,327	192,327	81.36	100	69.0
J	255,519	197,861	197,861	77.77	100	68.9
A	241,493	187,923	187,923	81.05	100	69.7
S	247,762	191,530	191,530	82.13	100	70.5
O	327,065	227,853	230,132	86.77	101	70.8
N	293,994	219,953	222,153	87.70	101	70.2
D	284,152	215,190	215,190	89.77	100	70.1
1913						
J	301,249	225,468	225,468	90.17	100	70.3
F	278,379	210,704	210,704	92.37	100	69.8
M	254,395	204,497	204,497	89.15	100	69.9
A	268,511	210,640	210,640	91.76	100	69.7
M	256,855	201,335	201,335	91.04	100	68.9
J	258,451	203,283	201,250	87.62	99	69.0
J	236,933	203,052	203,052	82.60	100	69.5
A	218,136	184,074	184,074	82.12	100	69.7
S	248,531	200,433	202,437	83.53	101	70.6
O	280,434	227,493	229,768	82.14	101	70.4
N	252,896	213,150	213,150	74.44	100	70.1
D	258,065	219,129	219,129	63.99	100	69.1
1914						
J	302,327	222,894	222,894	60.81	100	68.6
F	258,485	203,461	203,461	67.45	100	68.3
M	253,203	209,106	209,106	75.74	100	68.0
A	284,884	214,357	214,357	75.67	100	67.6
M	233,501	193,587	193,587	67.51	100	67.4
J	261,473	205,953	205,953	63.93	100	67.4
J	263,887	206,132	206,132	63.15	100	67.3
A	147,781	172,999	174,729	64.36	101	69.6
S	154,271	180,399	182,203	62.75	101	70.2
O	180,950	200,039	200,039	57.36	100	68.0
N	179,981	193,629	191,693	50.61	99	67.5
D	210,635	199,645	199,645	48.90	100	67.3

BANK CLEARINGS, PIG IRON AND PRICES A265

TABLE 27—(Continued)

PART II

Date	1 Clear. N. Y.	2 Def. Cl. outs. N. Y.	3 Clear. outs. N. Y.	4 Pig Iron	5 Snyder's Prices	6 B. of L. Prices
1915						
J	235,086	202,003	202,003	51.66	100	68.1
F	231,494	196,018	196,018	59.81	100	68.6
M	244,036	204,858	204,858	66.58	100	68.2
A	293,722	206,858	208,927	70.55	101	68.7
M	278,553	193,414	195,348	73.02	101	69.0
J	267,516	203,366	205,400	79.36	101	68.3
J	280,498	199,267	203,252	82.69	102	69.3
A	275,401	181,497	186,942	89.67	103	68.6
S	320,812	198,846	206,800	95.09	104	68.3
O	410,957	225,849	241,658	100.82	107	70.2
N	394,314	237,897	254,550	101.24	107	71.7
D	397,779	240,887	260,158	103.33	108	74.0
1916						
J	397,639	229,516	252,468	102.75	110	77.0
F	382,991	223,653	248,255	106.46	111	78.5
M	404,770	234,419	264,594	107.67	113	80.4
A	387,420	227,120	258,917	107.59	114	81.7
M	405,191	231,307	263,690	108.42	114	82.5
J	418,451	235,235	270,520	107.05	115	82.9
J	368,992	224,477	258,148	104.02	115	83.4
A	379,591	222,272	260,058	103.35	117	85.1
S	478,531	236,522	283,827	106.75	120	86.9
O	506,813	265,312	323,681	113.19	122	91.1
N	555,112	269,323	339,347	110.39	126	97.4
D	546,310	263,589	334,758	102.54	127	99.2
1917						
J	487,979	265,313	339,600	101.64	128	102.1
F	456,931	243,066	315,986	94.47	130	104.5
M	459,004	258,502	341,223	104.88	132	107.7
A	488,408	254,272	345,810	111.17	136	114.1
M	502,691	249,429	346,706	110.24	139	120.7
J	569,969	249,998	354,997	109.00	142	122.0
J	489,849	240,071	338,500	107.82	141	123.0
A	473,526	236,899	336,397	104.77	142	124.8
S	462,797	238,495	338,663	104.47	142	123.5
O	507,206	285,284	405,103	106.55	142	122.2
N	494,473	293,438	413,747	106.86	141	122.8
D	471,405	269,366	385,194	93.00	143	122.9
1918						
J	474,809	265,329	382,074	77.80	144	125.0
F	437,834	244,838	357,464	82.83	146	122.7
M	446,460	269,030	395,474	103.65	147	126.4
A	469,783	277,497	413,470	109.61	149	128.3
M	501,926	271,820	410,448	111.18	151	128.1
J	495,255	271,839	415,913	110.79	153	129.0
J	496,813	275,975	427,761	110.35	155	132.0
A	482,530	269,853	426,368	109.34	158	134.3
S	455,462	265,175	424,280	113.94	160	137.5
O	545,652	302,069	489,352	112.48	162	136.3
N	520,194	283,165	458,727	111.80	162	136.3
D	537,389	278,694	457,058	110.76	164	136.3

TABLE 27—(Continued)

PART II

Date	1 Clear. N. Y.	2 Def. Cl. outs. N. Y.	3 Clear. outs. N. Y.	4 Pig Iron	5 Snyder's Prices	6 B. of L. Prices
1919						
J	576,150	288,294	469,919			
1919	"Debits to individual acc'ts"					
J	584,484	332,674	542,258	106.53	163	134.4
F	517,571	303,261	488,250	105.01	161	129.8
M	538,645	308,085	499,097	99.69	162	131.3
A	577,433	312,256	512,100	82.61	164	133.0
M	655,806	322,523	538,613	68.00	167	135.3
J	719,000	345,902	588,033	70.50	170	135.6
J	723,452	345,365	600,935	78.34	174	141.1
A	654,065	323,827	569,935	88.50	176	144.3
S	681,533	342,538	602,867	82.93	176	141.1
O	781,484	366,944	653,161	60.12	178	141.6
N	778,367	353,315	639,500	79.75	181	144.5
D	801,935	380,522	700,161	84.94	184	150.5
1920						
J	762,452	372,872	701,000	97.26	188	157.7
F	622,552	323,554	611,517	102.72	189	157.1
M	718,871	355,276	682,129	108.90	192	158.6
A	710,667	345,646	677,467	91.33	196	165.5
M	631,645	320,561	634,710	96.31	198	167.2
J	660,200	344,070	684,700	101.45	199	166.5
J	614,935	338,954	671,129	98.94	198	165.8
A	560,355	312,721	609,806	101.53	195	161.4
S	586,667	338,103	659,300	104.31	195	155.2
O	649,581	350,991	673,903	106.21	192	144.2
N	672,367	348,039	650,833	97.83	187	133.4
D	722,839	368,101	662,581	87.22	180	120.7
1921						
J	646,226	327,975	580,516	77.95	177	114.0
F	540,357	303,135	521,393	69.19	172	104.9
M	559,774	314,042	533,871	51.47	170	102.4
A	544,967	317,086	529,533	39.77	167	98.9
M	553,903	301,770	494,903	39.39	164	96.2
J	591,833	326,173	528,400	35.49	162	93.4
J	527,097	305,948	489,516	27.89	160	93.4
A	489,871	300,625	481,000	30.78	160	93.5
S	536,733	325,430	517,433	32.85	159	93.4
O	568,065	339,075	539,129	40.22	159	94.1
N	583,067	334,360	531,633	47.18	159	94.2
D	663,710	356,186	562,774	53.20	158	92.9
1922						
J	615,000	328,350	512,226	53.06	156	91.4
F	590,821	323,548	501,500	58.21	155	92.9
M	657,968	344,121	533,387	65.68	155	92.8
A	690,567	334,851	522,367	69.07	156	93.2
M	698,516	333,238	526,516	74.41	158	96.1
J	735,433	362,299	572,433	78.70	158	96.3
J	635,903	331,569	527,194	77.59	159	99.4
A	589,903	319,536	511,258	58.59	160	98.6
S	640,500	344,854	551,767	67.79	160	99.3
O	720,065	369,124	594,290	85.09	161	99.6
N	634,233	352,531	571,100	94.99	162	100.5
D	672,613	387,611	631,806	99.58	163	100.7

BANK CLEARINGS, PIG IRON AND PRICES A267

TABLE 27—(Continued)

PART II

Date	1 Debits N. Y.	2 Def. Deb. outs. N. Y.	3 Debits outs. N. Y.	4 Pig Iron	5 Snyder's Prices	6 B. of L. Prices
1923						
J	712,484	389,194	634,387	104.18	163	102.0
F	679,250	368,162	603,786	106.94	164	103.3
M	727,129	384,047	633,677	113.67	165	104.5
A	682,633	380,121	627,200	118.32	165	103.9
M	667,871	376,370	624,774	124.76	166	101.9
J	701,367	392,209	651,067	122.55	166	100.3
J	591,000	355,504	586,581	118.66	165	98.4
A	522,226	338,358	558,290	111.27	165	97.8
S	559,967	348,707	575,367	104.18	165	99.7
O	617,806	383,968	637,387	101.59	166	99.4
N	666,100	371,908	617,367	96.48	166	98.4
D	712,290	395,783	657,000	94.23	166	98.1
1924						
J	713,355	374,425	625,290	97.38	167	99.6
F	685,724	361,594	603,862	106.03	167	99.7
M	695,032	372,969	619,129	111.81	166	98.5
A	688,467	381,111	628,833	107.78	165	97.3
M	690,516	364,399	601,258	84.36	165	95.9
J	730,867	372,032	610,133	67.54	164	94.9
J	692,548	364,848	602,000	57.58	165	95.6
A	674,710	345,433	573,419	60.88	166	97.0
S	691,133	368,444	607,933	68.44	165	97.1
O	726,000	408,837	674,581	79.91	165	98.2
N	768,233	378,434	628,200	83.66	166	99.1
D	881,516	419,163	704,194	95.54	168	101.5
1925						
J	892,968	425,673	719,387	108.72	169	102.9
F	818,714	392,921	664,036	114.79	169	104.0
M	851,032	405,421	685,161	114.98	169	104.2
A	798,167	408,988	687,100	108.63	168	101.9
M	844,484	392,032	658,613	94.54	168	101.6
J	897,667	425,529	725,400	89.12	170	103.0
J	821,226	409,488	696,129	85.94	170	104.3
A	750,484	374,816	640,935	87.24	171	103.9
S	812,300	407,310	696,500	90.87	171	103.4
O	932,774	450,844	775,452	97.53	172	103.6
N	900,300	411,503	711,900	100.77	173	104.5
D	977,839	449,095	776,935	104.85	173	103.4
1926						
J	985,097	440,183	761,516	106.97	173	103.2
F	886,179	417,401	717,929	104.41	172	102.0
M	1,064,710	442,520	756,710	111.03	171	100.6
A	976,667	439,318	751,233	115.00	171	100.3
M	857,129	404,622	691,903	112.30	171	100.5
J	939,867	418,109	714,967	107.84	171	100.4
J	892,226	439,540	751,613	103.98	171	99.5
A	846,226	391,964	670,258	103.24	171	99.1
S	853,933	413,488	711,200	104.54	172	99.7
O	927,581	448,595	767,097	107.55	171	99.4
N	859,667	418,469	719,767	107.89	172	98.4
D	1,050,871	462,045	790,097	99.71	171	97.9

TABLE 27—(Continued)

PART II

Date	1 Debits N. Y.	2 Def. Deb. outs. N. Y.	3 Debits outs. N. Y.	4 Pig Iron	5 Snyder's Prices	6 B. of L. Prices
1927						
J	1,008,323	445,085	756,645	100.12	170	96.5
F	979,964	436,576	742,179	105.02	170	95.8
M	1,112,645	455,901	775,032	112.37	170	94.7
A	1,066,900	465,010	785,867	114.07	169	94.1
M	1,008,710	434,023	737,839	109.39	170	94.2
J	1,100,267	464,171	793,733	102.99	171	94.1
J	991,935	435,142	739,742	95.20	170	94.3
A	1,021,065	415,922	711,226	95.07	171	95.2
S	1,112,300	450,501	779,367	92.50	173	96.3
O	1,099,710	468,227	810,032	89.81	173	96.6
N	1,109,400	458,632	793,433	88.28	173	96.3
D	1,256,065	491,342	854,935	86.96	174	96.4
1928						
J	1,222,065	466,176	806,484	92.57	173	96.4
F	1,128,966	433,625	750,172	100.00	173	95.8
M	1,444,710	479,180	833,774	103.22	174	95.5
A	1,392,600	480,476	840,833	106.18	175	96.6
M	1,460,323	480,153	849,871	105.93	177	97.5
J	1,515,167	511,913	900,967	102.73	176	96.7
J	1,131,774	437,995	770,871	99.09	176	97.4
A	1,132,323	428,904	754,871	101.18	176	97.6
S	1,290,833	457,865	815,000	102.08	178	98.6
O	1,457,710	504,921	893,710	108.83	177	96.7
N	1,515,633	484,644	862,667	110.08	178	95.8
D	1,700,871	537,496	956,742	108.71	178	95.8
1929						
J	1,765,129	506,866	907,290	111.04	179	95.9
F	1,653,179	489,126	875,536	114.51	179	95.4
M	1,787,903	504,140	907,452	119.82	180	96.1
A	1,599,300	499,125	893,433	122.09	179	95.5
M	1,614,290	477,924	855,484	125.75	179	94.7
J	1,442,100	492,141	880,933	123.91	179	95.2
J	1,587,581	506,933	917,548	122.10	181	96.5
A	1,581,742	502,286	914,161	121.15	182	96.3
S	1,678,067	497,523	910,467	116.59	183	96.1
O	2,042,742	574,960	1,040,677	115.75	181	95.1
N	1,786,800	546,341	950,633	106.05	174	93.5
D	1,285,484	499,295	868,774	91.51	174	93.3
1930						
J	1,120,387	476,882	829,774	91.21	174	92.5
F	1,111,321	444,550	769,071	101.39	173	91.4
M	1,314,194	466,418	806,903	104.72	173	90.2
A	1,287,700	466,418	811,567	106.06	174	90.0
M	1,207,194	457,914	787,613	104.28	172	88.8
J	1,256,333	486,134	821,567	97.80	169	86.8
J	954,839	447,576	747,452	85.15	167	84.4
A	808,129	407,423	676,323	81.42	166	84.3
S	912,767	424,211	708,433	75.89	167	84.4
O	992,935	469,028	764,516	69.83	163	83.0
N	749,667	407,868	656,667	62.24	161	81.3
D	935,516	471,764	745,387	53.73	158	79.6

BANK CLEARINGS, PIG IRON AND PRICES A269

TABLE 27—(Continued)

PART II

Date	1 Debits N. Y.	2 Def. Deb. outs. N. Y.	3 Debit outs. N. Y.	4 Pig Iron	5 Snyder's Prices	6 B. of L. Prices
1931						
J	792,161	445,798	699,903	55.30	157	78.2
F	748,143	388,626	610,143	60.95	157	76.8
M	889,968	399,034	626,484	65.56	157	76.0
A	894,033	421,935	654,000	67.32	155	74.8
M	808,774	397,597	608,323	64.33	153	73.2
J	863,100	431,245	646,867	54.62	150	72.1
J	677,645	399,307	594,968	47.20	149	72.0
A	564,548	357,783	533,097	41.31	149	72.1
S	669,100	377,029	554,233	38.96	147	71.2
O	667,032	406,003	584,645	37.85	144	70.3
N	482,133	338,078	486,833	36.78	144	70.2
D	620,419	394,286	552,000	31.63	140	68.6
1932						
J	570,194	371,505	512,677	31.38	138	67.3
F	495,897	326,318	443,793	33.25	136	66.3
M	521,290	323,264	442,871	31.20	137	66.0
A	518,600	357,338	478,833	28.43	134	65.5
M	416,548	305,425	403,161	25.28	132	64.4
J	473,400	333,359	430,033	20.94	129	63.9
J	410,581	312,853	403,581	18.46	129	64.5
A	434,129	287,317	379,258	17.12	132	65.2
S	472,100	297,172	392,267	19.75	132	65.3
O	417,548	304,211	398,516	20.80	131	64.4
N	327,167	280,385	364,500	21.04	130	63.9
D	450,548	323,084	413,548	17.62	128	62.6
1933						
J	400,419	306,146	388,806	18.35	127	61.0
F	429,857	299,568	371,464	19.80	124	59.8
M	.....	.....	.....	17.48	123	60.2
A	400,400	285,377	353,867	20.79	124	60.4
M	450,871	292,329	371,258	28.62	127	62.7
J	558,100	337,709	432,267	42.17	128	65.0
J	559,806	339,149	447,677	57.82	132	68.9
A	421,806	302,420	399,194	59.14	132	69.5
S	411,333	306,141	407,167	50.74	133	70.8
O	428,387	315,959	420,226	43.75	133	71.2
N	406,800	298,923	397,567	36.17	133	71.1
D	419,774	324,731	428,645	38.13	132	70.8
1934						
J	452,355	320,107	425,742	39.20	133	72.2
F	472,536	309,454	420,857	45.13	136	73.6
M	503,484	333,895	454,097	52.24	136	73.7
A	565,133	343,163	470,133	57.56	137	73.3
M	472,677	338,638	460,548	65.90	136	73.7
J	512,933	358,978	491,800	64.34	137	74.6
J	446,516	325,152	448,710	39.51	138	74.8
A	396,290	313,721	432,935	34.01	138	76.4
S	374,067	309,041	429,567	29.94	139	77.6
O	396,323	335,670	466,581	30.68	139	76.5
N	378,100	319,262	446,967	31.90	140	76.5
D	490,774	361,774	506,484	33.15	140	76.9

*Not available, complete data not having been reported on account of bank holidays.

TABLE 27—(Concluded)

PART II

Date	1 Debits N. Y.	2 Def. Deb. outs. N. Y.	3 Debits outs. N. Y.	4 Pig Iron	5 Snyder's Prices	6 B. of L. Prices
1935						
J	483,806	344,635	485,935	47.66	141	78.8
F	448,179	331,514	470,750	57.45	142	79.5
M	512,742	362,594	511,258	57.10	141	79.4
A	530,167	369,625	524,867	55.45	142	80.1
M	439,387	353,147	505,000	55.71	143	80.2
J	522,233	368,380	530,467	51.75	144	79.8
J	539,903	370,568	537,323	49.04	145	79.4
A	475,225	345,647	504,645	56.82	146	80.5
S	467,133	343,016	504,233	59.22	147	80.7
O	507,516	369,703	547,161	63.82	148	80.5
N	518,067	375,884	560,067	68.86	149	80.6
D	570,452	407,361	606,968	67.95	149	80.9
1936						
J	578,226	339,914	509,871	65.35	150	80.6
F	545,034	360,036	543,655	62.89	151	80.6
M	633,194	381,671	576,323	65.82	151	79.6
A	576,167	388,822	583,233	80.12	150	79.7
M	523,452	365,549	548,323	85.43	150	78.6
J	620,767	414,035	629,333	86.21	152	79.2
J	522,548	389,966	600,548	83.69	154	80.5
A	463,290	353,722	551,806	87.48	156	81.6
S	521,867	375,769	586,200	91.01	156	81.6
O	553,903	416,501	649,742	96.51	156	81.5
N	579,800	389,768	615,833	98.25	158	82.4
D	730,903	471,455	749,613	100.48	159	84.2
1937						
J	616,000	408,395	657,516	103.60	161	85.9

TABLE 28

DAILY AVERAGE BANK CLEARINGS IN NEW YORK CITY, MONTHLY,
JANUARY 1857 - JANUARY 1919, INCLUSIVE; DAILY AVERAGE
BANK DEBITS IN NEW YORK CITY, MONTHLY,
JANUARY 1919 - JANUARY 1936

- Col. 1. Logarithms of Data (in thousands of dollars) Adjusted for Seasonal Fluctuations.
- Col. 2. Cyclical Curve (logarithms).
- Col. 3. Trend Curve (logarithms).
- Col. 4. Deviations of Cyclical Curve (logarithms) from Trend Curve (logarithms).
- Col. 5. Changing Seasonal Fluctuations (logarithms).

For details of the nature of the graduations given in Columns 2 and 3 and of the seasonal given in Column 5 of this table, see Appendix D.

TABLE 28

BANK CLEARINGS IN NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1857						1862					
J	4.357	4.3866	4.2521	+ .1345	-.017	J	4.164	4.1848	4.3479	-.1631	-.001
F	4.376	4.3884	4.2519	+ .1365	-.000	F	4.184	4.2070	4.3600	-.1530	+.009
M	4.357	4.3818	4.2516	+ .1302	+.027	M	4.170	4.2325	4.3724	-.1399	+.030
A	4.380	4.3665	4.2513	+ .1152	+.027	A	4.221	4.2607	4.3848	-.1241	+.014
M	4.363	4.3432	4.2509	+.0923	+.032	M	4.335	4.2913	4.3973	-.1060	+.018
J	4.384	4.3133	4.2506	+.0627	-.004	J	4.364	4.3240	4.4109	-.0869	-.021
J	4.387	4.2790	4.2502	+.0288	-.016	J	4.382	4.3580	4.4245	-.0665	-.038
A	4.371	4.2426	4.2499	-.0073	-.037	A	4.358	4.3925	4.4386	-.0461	-.051
S	4.220	4.2062	4.2497	-.0435	-.014	S	4.424	4.4270	4.4525	-.0255	-.017
O	3.999	4.1719	4.2493	-.0774	-.001	O	4.498	4.4605	4.4673	-.0068	+.045
N	4.022	4.1417	4.2488	-.1071	+.008	N	4.434	4.4921	4.4821	+.0100	+.032
D	4.043	4.1172	4.2482	-.1310	-.006	D	4.493	4.5214	4.4973	+.0241	-.019
1858						1863					
J	4.059	4.0999	4.2477	-.1478	-.015	J	4.600	4.5483	4.5128	+.0355	+.001
F	4.101	4.0909	4.2467	-.1558	+.004	F	4.624	4.5729	4.5289	+.0440	+.008
M	4.143	4.0907	4.2457	-.1550	+.029	M	4.595	4.5960	4.5449	+.0511	+.030
A	4.142	4.0987	4.2446	-.1459	+.026	A	4.586	4.6183	4.5610	+.0573	+.011
M	4.151	4.1140	4.2438	-.1298	+.031	M	4.676	4.6403	4.5764	+.0639	+.017
J	4.170	4.1344	4.2420	-.1076	-.009	J	4.630	4.6624	4.5935	+.0689	-.019
J	4.169	4.1574	4.2405	-.0831	-.025	J	4.648	4.6848	4.6095	+.0753	-.039
A	4.169	4.1803	4.2389	-.0586	-.040	A	4.706	4.7071	4.6245	+.0826	-.053
S	4.175	4.2010	4.2372	-.0362	-.015	S	4.739	4.7285	4.6406	+.0879	-.016
O	4.219	4.2181	4.2352	-.0171	+.009	O	4.746	4.7486	4.6561	+.0925	+.048
N	4.238	4.2307	4.2330	-.0023	+.014	N	4.738	4.7670	4.6719	+.0951	+.032
D	4.240	4.2393	4.2306	+.0087	-.009	D	4.776	4.7836	4.6875	+.0961	-.019
1859						1864					
J	4.231	4.2448	4.2281	+.0167	-.012	J	4.754	4.7982	4.7022	+.0960	+.003
F	4.241	4.2481	4.2256	+.0225	+.007	F	4.852	4.8112	4.7168	+.0944	+.005
M	4.247	4.2502	4.2229	+.0273	+.029	M	4.919	4.8227	4.7309	+.0918	+.030
A	4.285	4.2519	4.2204	+.0315	+.024	A	4.935	4.8323	4.7445	+.0878	+.010
M	4.276	4.2534	4.2179	+.0355	+.029	M	4.766	4.8403	4.7579	+.0824	+.016
A	4.249	4.2547	4.2155	+.0392	-.014	J	4.818	4.8463	4.7703	+.0760	-.016
J	4.223	4.2559	4.2132	+.0427	-.030	J	4.798	4.8501	4.7828	+.0673	-.039
J	4.247	4.2572	4.2111	+.0461	-.044	J	4.812	4.8521	4.7941	+.0580	-.054
A	4.269	4.2589	4.2092	+.0497	-.016	A	4.858	4.8527	4.8050	+.0477	-.016
S	4.250	4.2616	4.2076	+.0540	+.020	S	4.787	4.8523	4.8151	+.0372	+.049
O	4.264	4.2660	4.2063	+.0597	+.020	O	4.875	4.8516	4.8248	+.0268	+.032
N	4.287	4.2721	4.2053	+.0668	-.012	N	4.913	4.8509	4.8338	+.0171	-.020
D						D					
1860						1865					
J	4.287	4.2799	4.2046	+.0753	-.009	J	4.917	4.8505	4.8418	+.0087	+.005
F	4.269	4.2892	4.2043	+.0849	+.008	F	4.887	4.8502	4.8495	+.0007	+.002
M	4.295	4.2992	4.2046	+.0946	+.030	M	4.864	4.8497	4.8562	-.0065	+.030
A	4.300	4.3086	4.2054	+.1032	+.021	A	4.723	4.8484	4.8627	-.0143	+.009
M	4.314	4.3164	4.2069	+.1095	+.025	M	4.832	4.8464	4.8682	-.0218	+.016
J	4.302	4.3215	4.2087	+.1128	-.018	J	4.845	4.8435	4.8734	-.0299	-.013
J	4.346	4.3396	4.2141	+.1117	-.034	J	4.877	4.8404	4.8779	-.0375	-.039
A	4.346	4.3396	4.2141	+.1055	-.047	A	4.877	4.8379	4.8819	-.0440	-.056
S	4.330	4.3118	4.2179	+.0939	-.017	S	4.806	4.8370	4.8854	-.0484	-.015
O	4.352	4.2997	4.2218	+.0779	+.032	O	4.868	4.8389	4.8887	-.0498	+.048
N	4.320	4.2838	4.2267	+.0571	+.026	N	4.845	4.8443	4.8914	-.0471	+.031
D	4.200	4.2651	4.2321	+.0330	-.015	D	4.825	4.8534	4.8938	-.0404	-.019
1861						1866					
J	4.234	4.2446	4.2382	+.0064	-.005	J	4.879	4.8659	4.8960	-.0301	+.006
F	4.222	4.2233	4.2448	-.0215	+.009	F	4.854	4.8807	4.8980	-.0173	-.002
M	4.203	4.2023	4.2520	-.0497	+.030	M	4.885	4.8964	4.8997	-.0033	+.030
A	4.225	4.1829	4.2595	-.0766	+.017	A	4.887	4.9118	4.9012	+.0106	+.011
M	4.131	4.1660	4.2674	-.1014	+.022	M	4.926	4.9252	4.9024	+.0238	+.018
J	4.110	4.1522	4.2760	-.1238	-.021	J	4.953	4.9356	4.9037	+.0319	-.009
J	4.144	4.1426	4.2850	-.1424	-.036	J	4.910	4.9423	4.9048	+.0375	-.038
A	4.123	4.1376	4.2945	-.1569	-.049	A	4.970	4.9449	4.9058	+.0391	-.058
S	4.126	4.1375	4.3044	-.1669	-.017	S	4.921	4.9432	4.9066	+.0366	-.013
O	4.180	4.1423	4.3146	-.1723	+.041	O	5.001	4.9375	4.9074	+.0301	+.046
N	4.192	4.1521	4.3251	-.1730	+.029	N	5.037	4.9284	4.9081	+.0203	+.027
D	4.216	4.1664	4.3365	-.1701	-.017	D	4.919	4.9163	4.9088	+.0075	-.019

BANK CLEARINGS

A273

TABLE 28—Continued

BANK CLEARINGS IN NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1867						1872					
J	4.889	4.9025	4.9095	-.0070	+.006	J	4.971	4.9493	4.9360	+.0133	+.016
F	4.833	4.8879	4.9101	-.0222	-.005	F	4.933	4.9528	4.9349	+.0179	+.004
M	4.805	4.8737	4.9108	-.0371	+.030	M	4.975	4.9584	4.9336	+.0248	+.026
A	4.835	4.8612	4.9114	-.0502	+.015	A	5.030	4.9662	4.9322	+.0340	+.043
M	4.835	4.8514	4.9119	-.0605	+.020	M	5.011	4.9756	4.9307	+.0449	+.029
J	4.814	4.8450	4.9126	-.0676	-.005	J	4.921	4.9862	4.9291	+.0571	+.001
J	4.893	4.8423	4.9131	-.0708	-.037	J	4.900	4.9976	4.9274	+.0702	+.041
A	4.860	4.8431	4.9138	-.0707	-.061	A	5.008	5.0083	4.9256	+.0827	+.073
S	4.886	4.8472	4.9142	-.0670	-.012	S	4.983	5.0174	4.9239	+.0935	+.011
O	4.861	4.8537	4.9148	-.0611	+.041	O	5.078	5.0242	4.9219	+.1023	+.019
N	4.842	4.8614	4.9152	-.0538	+.022	N	5.061	5.0276	4.9198	+.1078	+.007
D	4.829	4.8697	4.9158	-.0461	-.017	D	5.033	5.0263	4.9176	+.1087	+.003
1868						1873					
J	4.913	4.8776	4.9163	-.0387	+.007	J	4.991	5.0202	4.9153	+.1049	+.019
F	4.924	4.8847	4.9168	-.0321	-.007	F	5.057	5.0089	4.9127	+.0962	+.001
M	4.911	4.8910	4.9172	-.0262	+.029	M	5.001	4.9921	4.9100	+.0821	+.025
A	4.900	4.8968	4.9176	-.0208	+.021	A	4.995	4.9707	4.9072	+.0635	+.044
M	4.842	4.9026	4.9180	-.0154	+.023	M	4.926	4.9461	4.9044	+.0417	+.027
J	4.912	4.9092	4.9184	-.0092	-.001	J	4.889	4.9193	4.9013	+.0180	+.004
J	4.902	4.9174	4.9188	-.0014	-.037	J	4.929	4.8920	4.8981	+.0061	+.043
A	4.939	4.9276	4.9192	+.0084	-.063	A	4.898	4.8661	4.8948	+.0287	+.074
S	4.900	4.9398	4.9195	+.0203	-.010	S	4.908	4.8426	4.8913	+.0487	+.013
O	5.004	4.9540	4.9198	+.0342	+.034	O	4.682	4.8227	4.8878	+.0651	+.018
N	5.012	4.9692	4.9202	+.0490	+.014	N	4.706	4.8070	4.8840	+.0770	+.008
D	4.968	4.9843	4.9205	+.0638	-.015	D	4.795	4.7961	4.8802	+.0841	+.007
1869						1874					
J	4.949	4.9981	4.9209	+.0772	+.008	J	4.843	4.7895	4.8761	+.0866	+.024
F	4.976	5.0093	4.9213	+.0880	-.008	F	4.814	4.7872	4.8720	+.0848	+.004
M	4.999	5.0161	4.9218	+.0943	+.029	M	4.811	4.7888	4.8678	+.0790	+.023
A	5.024	5.0186	4.9222	+.0964	+.027	A	4.824	4.7931	4.8636	+.0705	+.043
M	5.041	5.0165	4.9228	+.0937	+.026	M	4.788	4.7996	4.8595	+.0599	+.025
J	5.060	5.0099	4.9233	+.0866	+.001	J	4.830	4.8075	4.8551	+.0476	+.008
J	5.027	4.9994	4.9240	+.0754	-.038	J	4.832	4.8156	4.8508	+.0352	+.044
A	4.978	4.9866	4.9248	+.0618	-.066	A	4.775	4.8230	4.8465	+.0235	+.074
S	5.055	4.9716	4.9257	+.0459	-.009	S	4.824	4.8293	4.8422	+.0129	+.017
O	4.893	4.9556	4.9266	+.0290	+.028	O	4.846	4.8340	4.8379	+.0039	+.019
N	4.915	4.9388	4.9276	+.0112	+.007	N	4.808	4.8370	4.8337	+.0033	+.006
D	4.900	4.9218	4.9287	+.0069	-.011	D	4.851	4.8387	4.8295	+.0092	+.011
1870						1875					
J	4.872	4.9053	4.9298	-.0245	+.010	J	4.845	4.8394	4.8253	+.0141	+.029
F	4.869	4.8896	4.9309	-.0413	-.008	F	4.832	4.8393	4.8210	+.0183	+.008
M	4.854	4.8757	4.9321	-.0564	+.028	M	4.844	4.8385	4.8169	+.0216	+.022
A	4.832	4.8647	4.9333	-.0686	+.035	A	4.839	4.8372	4.8129	+.0243	+.039
M	4.920	4.8567	4.9345	-.0778	+.028	M	4.828	4.8348	4.8087	+.0261	+.021
J	4.883	4.8528	4.9358	-.0830	+.002	J	4.863	4.8310	4.8050	+.0260	+.011
J	4.958	4.8524	4.9369	-.0845	-.039	J	4.851	4.8257	4.8013	+.0244	+.045
A	4.850	4.8549	4.9379	-.0830	-.069	A	4.771	4.8188	4.7978	+.0210	+.072
S	4.799	4.8596	4.9387	-.0791	-.009	S	4.796	4.8102	4.7942	+.0160	+.020
O	4.821	4.8658	4.9396	-.0738	+.023	O	4.775	4.8006	4.7912	+.0094	+.021
N	4.850	4.8719	4.9403	-.0684	+.001	N	4.804	4.7907	4.7881	+.0026	+.000
D	4.908	4.8782	4.9409	-.0627	-.006	D	4.798	4.7811	4.7853	+.0042	+.014
1871						1876					
J	4.855	4.8844	4.9414	-.0570	+.012	J	4.782	4.7726	4.7826	+.0100	+.032
F	4.847	4.8908	4.9418	-.0510	-.007	F	4.804	4.7658	4.7802	+.0144	+.010
M	4.930	4.8977	4.9419	-.0442	+.027	M	4.774	4.7608	4.7782	+.0174	+.019
A	4.961	4.9050	4.9419	-.0369	+.040	A	4.710	4.7577	4.7765	+.0188	+.034
M	4.948	4.9129	4.9417	-.0288	+.029	M	4.741	4.7565	4.7750	+.0185	+.017
J	4.972	4.9211	4.9416	-.0205	+.001	J	4.756	4.7568	4.7737	+.0169	+.015
J	4.846	4.9285	4.9412	-.0127	-.040	J	4.736	4.7585	4.7728	+.0143	+.046
A	4.900	4.9349	4.9406	-.0057	-.071	A	4.772	4.7616	4.7721	+.0105	+.069
S	4.962	4.9398	4.9398	-.0000	-.010	S	4.781	4.7659	4.7717	+.0058	+.023
O	4.966	4.9451	4.9392	+.0039	+.020	O	4.787	4.7715	4.7716	+.0001	+.026
N	4.902	4.9451	4.9383	+.0068	-.004	N	4.765	4.7783	4.7718	+.0065	+.007
D	4.949	4.9469	4.9373	+.0096	-.002	D	4.782	4.7861	4.7722	+.0139	+.017

TABLE 28—Continued

BANK CLEARINGS IN NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1877						1882					
J	4.803	4.7944	4.7729	+ .0215	+ .033	J	5.118	5.0981	5.0923	+ .0058	+ .026
F	4.830	4.8026	4.7738	+ .0288	+ .012	F	5.095	5.0980	5.0915	+ .0065	+ .008
M	4.789	4.8097	4.7750	+ .0347	+ .016	M	5.161	5.1003	5.0898	+ .0104	+ .003
A	4.807	4.8153	4.7764	+ .0389	+ .027	A	5.119	5.1033	5.0877	+ .0156	+ .004
M	4.791	4.8186	4.7781	+ .0405	+ .013	M	5.016	5.1058	5.0849	+ .0209	+ .000
J	4.806	4.8195	4.7800	+ .0395	+ .019	J	5.071	5.1068	5.0817	+ .0251	+ .023
J	4.828	4.8181	4.7822	+ .0359	+ .047	J	5.102	5.1056	5.0781	+ .0275	+ .044
A	4.857	4.8149	4.7847	+ .0302	+ .066	A	5.132	5.1018	5.0741	+ .0277	+ .052
S	4.815	4.8104	4.7872	+ .0232	+ .026	S	5.156	5.0956	5.0695	+ .0261	+ .027
O	4.835	4.8052	4.7903	+ .0149	+ .031	O	5.100	5.0875	5.0646	+ .0229	+ .051
N	4.797	4.8000	4.7934	+ .0066	+ .014	N	5.138	5.0780	5.0595	+ .0185	+ .041
D	4.798	4.7951	4.7968	+ .0017	+ .020	D	5.065	5.0674	5.0541	+ .0133	+ .034
1878						1883					
J	4.779	4.7910	4.8002	- .0092	+ .034	J	5.005	5.0564	5.0486	+ .0078	+ .023
F	4.720	4.7877	4.8041	- .0164	+ .012	F	5.025	5.0454	5.0428	+ .0026	+ .005
M	4.766	4.7856	4.8084	- .0228	+ .012	M	5.005	5.0349	5.0370	- .0021	- .006
A	4.807	4.7844	4.8131	- .0287	+ .021	A	5.019	5.0255	5.0309	- .0054	- .007
M	4.773	4.7840	4.8180	- .0340	+ .010	M	5.015	5.0179	5.0248	- .0069	- .001
J	4.779	4.7844	4.8233	- .0389	+ .022	J	5.023	5.0125	5.0187	- .0062	- .021
J	4.823	4.7853	4.8291	- .0438	+ .047	J	4.992	5.0094	5.0127	- .0033	- .043
A	4.815	4.7863	4.8350	- .0487	+ .063	A	5.034	5.0085	5.0067	+ .0018	- .051
S	4.770	4.7877	4.8412	- .0535	+ .029	S	5.030	5.0091	5.0006	+ .0085	- .024
O	4.817	4.7896	4.8480	- .0584	+ .036	O	5.039	5.0102	4.9947	+ .0155	+ .053
N	4.810	4.7921	4.8549	- .0628	+ .022	N	4.942	5.0104	4.9885	+ .0216	+ .042
D	4.765	4.7957	4.8621	- .0664	+ .023	D	4.983	5.0085	4.9831	+ .0254	+ .035
1879						1884					
J	4.817	4.8013	4.8696	- .0683	+ .034	J	5.019	5.0037	4.9777	+ .0260	+ .019
F	4.822	4.8094	4.8773	- .0679	+ .012	F	5.007	4.9955	4.9724	+ .0231	+ .003
M	4.776	4.8206	4.8853	- .0647	+ .008	M	4.976	4.9837	4.9674	+ .0163	- .009
A	4.821	4.8355	4.8934	- .0579	+ .014	A	4.994	4.9687	4.9623	+ .0064	- .008
M	4.890	4.8538	4.9018	- .0480	+ .007	M	5.032	4.9512	4.9574	- .0062	- .001
J	4.824	4.8750	4.9101	- .0351	- .024	J	4.921	4.9316	4.9528	- .0212	- .019
J	4.863	4.8981	4.9186	- .0205	- .046	J	4.889	4.9108	4.9486	- .0378	- .042
A	4.930	4.9218	4.9274	- .0356	- .059	A	4.871	4.8895	4.9443	- .0548	- .051
S	4.916	4.9442	4.9361	+ .0381	- .030	S	4.857	4.8685	4.9406	- .0721	- .021
O	5.018	4.9639	4.9447	+ .0192	+ .040	O	4.830	4.8490	4.9369	- .0879	+ .054
N	5.040	4.9800	4.9533	+ .0267	+ .029	N	4.803	4.8325	4.9335	- .1010	+ .041
D	4.982	4.9918	4.9619	+ .0299	+ .025	D	4.849	4.8200	4.9305	- .1105	+ .036
1880						1885					
J	4.987	4.9993	4.9705	+ .0288	+ .032	J	4.831	4.8127	4.9276	- .1149	+ .017
F	4.993	5.0032	4.9790	+ .0242	+ .011	F	4.830	4.8113	4.9251	- .1138	+ .001
M	5.045	5.0048	4.9873	+ .0175	+ .004	M	4.823	4.8161	4.9229	- .1068	- .011
A	5.045	5.0052	4.9957	+ .0095	+ .006	A	4.803	4.8264	4.9209	- .0945	- .009
M	5.027	5.0061	5.0035	+ .0026	+ .004	M	4.809	4.8408	4.9109	- .0783	- .000
J	5.015	5.0089	5.0116	- .0027	- .025	J	4.823	4.8581	4.9177	- .0596	- .016
J	4.970	5.0143	5.0192	- .0049	- .046	J	4.927	4.8768	4.9164	- .0396	- .042
A	4.945	5.0229	5.0267	- .0038	- .056	A	4.870	4.8951	4.9154	- .0203	- .051
S	4.983	5.0347	5.0339	+ .0008	- .030	S	4.863	4.9120	4.9148	- .0028	- .018
O	4.974	5.0492	5.0408	+ .0084	+ .045	O	4.958	4.9268	4.9142	+ .0126	+ .054
N	5.098	5.0657	5.0475	+ .0182	+ .035	N	5.004	4.9390	4.9140	+ .0250	+ .040
D	5.115	5.0831	5.0540	+ .0291	+ .029	D	4.983	4.9485	4.9140	+ .0345	+ .036
1881						1886					
J	5.153	5.1004	5.0599	+ .0405	+ .029	J	4.950	4.9554	4.9144	+ .0410	+ .017
F	5.182	5.1163	5.0657	+ .0506	+ .010	F	4.992	4.9598	4.9149	+ .0449	- .001
M	5.131	5.1296	5.0708	+ .0588	+ .001	M	4.985	4.9619	4.9157	+ .0462	- .013
A	5.092	5.1393	5.0752	+ .0641	- .000	A	4.916	4.9623	4.9165	+ .0438	- .009
M	5.195	5.1446	5.0795	+ .0651	+ .002	M	4.891	4.9615	4.9173	+ .0442	- .000
J	5.172	5.1452	5.0830	+ .0622	- .024	J	4.973	4.9603	4.9183	+ .0420	- .013
J	5.143	5.1415	5.0861	+ .0554	- .045	J	4.943	4.9592	4.9197	+ .0395	- .041
A	5.113	5.1344	5.0887	+ .0457	- .053	A	4.951	4.9594	4.9213	+ .0381	- .052
S	5.085	5.1252	5.0906	+ .0346	- .029	S	4.954	4.9612	4.9230	+ .0382	- .015
O	5.092	5.1155	5.0920	+ .0235	+ .048	O	4.966	4.9645	4.9247	+ .0398	+ .054
N	5.075	5.1070	5.0926	+ .0144	+ .039	N	4.987	4.9692	4.9266	+ .0426	+ .039
D	5.108	5.1011	5.0927	+ .0084	+ .031	D	5.032	4.9748	4.9287	+ .0461	+ .035

BANK CLEARINGS

A275

TABLE 28—Continued

BANK CLEARINGS IN NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1887						1892					
J	4.964	4.9798	4.9310	+ .0488	+ .016	J	5.033	5.0040	4.9772	+ .0268	+ .026
F	4.949	4.9836	4.9330	+ .0506	- .003	F	5.052	5.0032	4.9742	+ .0290	+ .004
M	4.976	4.9853	4.9352	+ .0501	- .015	M	5.035	5.0009	4.9711	+ .0298	+ .013
A	5.013	4.9843	4.9376	+ .0467	- .008	A	5.011	4.9983	4.9678	+ .0305	+ .000
M	4.952	4.9805	4.9401	+ .0404	+ .002	M	4.970	4.9961	4.9644	+ .0317	+ .013
J	5.006	4.9743	4.9423	+ .0320	- .011	J	4.976	4.9953	4.9609	+ .0344	+ .005
J	4.964	4.9663	4.9447	+ .0216	- .041	J	4.958	4.9961	4.9574	+ .0387	+ .038
A	4.959	4.9572	4.9470	+ .0102	- .053	A	4.970	4.9983	4.9538	+ .0445	+ .058
S	4.965	4.9479	4.9495	- .0016	- .014	S	4.984	5.0015	4.9503	+ .0512	+ .017
O	4.930	4.9391	4.9515	- .0124	+ .053	O	4.962	5.0048	4.9466	+ .0582	+ .035
N	4.953	4.9311	4.9538	- .0227	+ .037	N	4.996	5.0072	4.9429	+ .0643	+ .029
D	4.912	4.9244	4.9559	- .0315	+ .034	D	5.035	5.0079	4.9392	+ .0687	+ .030
1888						1893					
J	4.893	4.9192	4.9581	- .0389	+ .017	J	5.032	5.0056	4.9354	+ .0702	+ .028
F	4.887	4.9157	4.9600	- .0443	- .004	F	5.044	5.0000	4.9315	+ .0685	+ .004
M	4.902	4.9138	4.9618	- .0480	- .016	M	5.031	4.9905	4.9278	+ .0627	+ .010
A	4.939	4.9139	4.9636	- .0497	- .006	A	4.970	4.9768	4.9240	+ .0528	+ .001
M	4.939	4.9159	4.9651	- .0492	+ .005	M	4.981	4.9595	4.9203	+ .0392	+ .013
J	4.904	4.9197	4.9667	- .0470	- .009	J	4.947	4.9390	4.9165	+ .0225	+ .005
J	4.920	4.9253	4.9681	- .0428	- .041	J	4.925	4.9165	4.9128	+ .0037	+ .037
A	4.945	4.9322	4.9694	- .0372	- .054	A	4.858	4.8934	4.9091	- .0157	+ .058
S	4.964	4.9402	4.9703	- .0301	- .013	S	4.807	4.8709	4.9056	- .0347	+ .019
O	4.962	4.9485	4.9715	- .0230	+ .051	O	4.827	4.8507	4.9021	- .0514	+ .030
N	4.922	4.9570	4.9724	- .0154	+ .035	N	4.849	4.8336	4.8986	- .0650	+ .027
D	4.950	4.9651	4.9734	- .0083	+ .032	D	4.824	4.8205	4.8955	- .0750	+ .030
1889						1894					
J	4.978	4.9722	4.9742	- .0020	+ .018	J	4.814	4.8115	4.8924	- .0809	+ .030
F	4.988	4.9783	4.9752	+ .0031	- .005	F	4.793	4.8062	4.8894	- .0832	+ .004
M	4.986	4.9833	4.9762	+ .0071	- .017	M	4.827	4.8042	4.8865	- .0823	+ .007
A	4.967	4.9871	4.9771	+ .0100	- .005	A	4.825	4.8046	4.8838	- .0792	+ .003
M	4.988	4.9897	4.9780	+ .0117	+ .009	M	4.816	4.8068	4.8812	- .0744	+ .013
J	5.018	4.9916	4.9790	+ .0126	- .008	J	4.807	4.8101	4.8789	- .0688	+ .006
J	5.012	4.9929	4.9801	+ .0128	- .040	J	4.810	4.8143	4.8767	- .0624	+ .036
A	5.003	4.9941	4.9812	+ .0129	- .055	A	4.840	4.8193	4.8746	- .0553	+ .059
S	4.968	4.9956	4.9824	+ .0132	- .014	S	4.816	4.8253	4.8725	- .0472	+ .022
O	5.019	4.9976	4.9837	+ .0139	+ .048	O	4.841	4.8326	4.8708	- .0382	+ .026
N	4.995	5.0003	4.9850	+ .0153	+ .034	N	4.847	4.8412	4.8693	- .0281	+ .026
D	4.978	5.0037	4.9864	+ .0173	+ .031	D	4.847	4.8511	4.8680	- .0169	+ .030
1890						1895					
J	5.003	5.0076	4.9878	+ .0198	+ .021	J	4.856	4.8623	4.8669	- .0046	+ .032
F	5.009	5.0117	4.9894	+ .0223	- .006	F	4.827	4.8742	4.8662	+ .0080	+ .004
M	4.976	5.0152	4.9907	+ .0245	- .017	M	4.864	4.8861	4.8657	+ .0204	+ .005
A	4.992	5.0180	4.9921	+ .0259	- .003	A	4.892	4.8977	4.8655	+ .0322	+ .006
M	5.076	5.0193	4.9932	+ .0261	+ .011	M	4.949	4.9081	4.8654	+ .0427	+ .012
J	5.028	5.0186	4.9945	+ .0241	- .006	J	4.923	4.9168	4.8659	+ .0509	+ .006
J	5.001	5.0159	4.9955	+ .0204	- .040	J	4.945	4.9234	4.8667	+ .0567	+ .034
A	5.037	5.0111	4.9964	+ .0147	- .057	A	4.933	4.9276	4.8678	+ .0598	+ .059
S	5.027	5.0041	4.9971	+ .0070	- .014	S	4.922	4.9293	4.8692	+ .0601	+ .024
O	5.017	4.9953	4.9975	+ .0022	+ .044	O	4.954	4.9286	4.8711	+ .0575	+ .022
N	5.016	4.9854	4.9978	- .0124	+ .032	N	4.912	4.9261	4.8735	+ .0526	+ .025
D	4.936	4.9750	4.9979	- .0229	+ .030	D	4.942	4.9221	4.8762	+ .0459	+ .031
1891						1896					
J	4.957	4.9651	4.9978	- .0327	+ .023	J	4.882	4.9172	4.8795	+ .0377	+ .035
F	4.920	4.9568	4.9974	- .0406	- .005	F	4.918	4.9119	4.8833	+ .0286	+ .005
M	4.912	4.9511	4.9968	- .0457	- .015	M	4.875	4.9067	4.8873	+ .0194	+ .002
A	4.987	4.9486	4.9959	- .0473	- .002	A	4.894	4.9016	4.8917	+ .0099	+ .008
M	4.959	4.9499	4.9945	- .0446	+ .013	M	4.866	4.8967	4.8963	+ .0004	+ .012
J	4.934	4.9549	4.9932	- .0383	- .005	J	4.914	4.8920	4.9014	+ .0094	+ .008
J	4.942	4.9626	4.9917	- .0291	- .039	J	4.935	4.8877	4.9069	+ .0192	+ .032
A	4.947	4.9723	4.9898	- .0175	- .058	A	4.862	4.8838	4.9125	+ .0287	+ .059
S	5.059	4.9823	4.9875	- .0052	- .015	S	4.864	4.8806	4.9182	+ .0376	+ .027
O	4.986	4.9913	4.9854	+ .0059	+ .039	O	4.907	4.8787	4.9243	+ .0456	+ .019
N	5.962	4.9983	4.9829	+ .0154	+ .030	N	4.927	4.8786	4.9305	+ .0519	+ .025
D	4.992	5.0025	4.9801	+ .0224	+ .030	D	4.902	4.8810	4.9369	+ .0559	+ .031

TABLE 28—Continued

BANK CLEARINGS IN NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1897						1902					
J	4.885	4.8862	4.9434	-.0572	+.037	J	5.300	5.2855	5.2758	+.0097	+.049
F	4.870	4.8943	4.9500	-.0557	-.006	F	5.292	5.2866	5.2760	+.0106	-.011
M	4.887	4.9055	4.9566	-.0511	-.000	M	5.248	5.2918	5.2763	+.0153	+.002
A	4.863	4.9194	4.9635	-.0446	+.012	A	5.362	5.2998	5.2767	+.0231	+.011
M	4.862	4.9353	4.9704	-.0351	+.011	M	5.331	5.3089	5.2773	+.0316	+.011
J	4.943	4.9526	4.9772	-.0246	-.010	J	5.244	5.3177	5.2776	+.0401	-.025
J	4.992	4.9703	4.9842	-.0139	-.031	J	5.353	5.3249	5.2781	+.0468	-.025
A	5.036	4.9876	4.9913	-.0037	-.059	A	5.330	5.3298	5.2786	+.0512	-.057
S	5.091	5.0032	4.9983	+.0049	-.030	S	5.394	5.3318	5.2793	+.0525	-.038
O	5.015	5.0161	5.0053	+.0108	+.017	O	5.365	5.3312	5.2800	+.0512	+.019
N	4.993	5.0256	5.0123	+.0133	+.024	N	5.317	5.3279	5.2810	+.0469	+.021
D	5.033	5.0314	5.0195	+.0119	+.031	D	5.272	5.3224	5.2821	+.0403	+.027
1898						1903					
J	5.037	5.0336	5.0266	+.0070	+.039	J	5.314	5.3149	5.2833	+.0316	+.051
F	5.105	5.0335	5.0537	-.0002	-.006	F	5.284	5.3060	5.2848	+.0212	-.012
M	5.040	5.0322	5.0408	-.0086	+.002	M	5.285	5.2958	5.2864	+.0094	+.002
A	4.965	5.0315	5.0480	-.0165	+.016	A	5.271	5.2847	5.2882	-.0035	+.026
M	4.995	5.0334	5.0553	-.0219	+.011	M	5.246	5.2728	5.2902	-.0174	+.009
J	5.049	5.0392	5.0624	-.0232	-.012	J	5.308	5.2605	5.2923	-.0318	-.026
J	5.011	5.0496	5.0697	-.0201	-.029	J	5.309	5.2478	5.2946	-.0468	-.024
A	5.113	5.0650	5.0771	-.0121	-.059	A	5.231	5.2350	5.2971	-.0621	-.054
S	5.089	5.0846	5.0847	-.0001	-.033	S	5.194	5.2223	5.2999	-.0776	-.039
O	5.041	5.1072	5.0721	+.0151	+.016	O	5.206	5.2102	5.3024	-.0922	+.021
N	5.098	5.1312	5.0997	+.0315	+.024	N	5.166	5.1992	5.3053	-.1061	+.020
D	5.146	5.1550	5.1072	+.0478	+.030	D	5.223	5.1905	5.3082	-.1177	+.026
1899						1904					
J	5.223	5.1769	5.1150	+.0619	+.041	J	5.210	5.1849	5.3115	-.1266	+.054
F	5.218	5.1962	5.1227	+.0735	-.007	F	5.196	5.1835	5.3144	-.1309	-.012
M	5.278	5.2119	5.1304	+.0815	+.002	M	5.189	5.1874	5.3175	-.1301	+.001
A	5.249	5.2237	5.1381	+.0856	+.020	A	5.180	5.1969	5.3206	-.1237	+.023
M	5.239	5.2316	5.1457	+.0859	+.012	M	5.187	5.2119	5.3239	-.1120	+.007
J	5.217	5.2353	5.1534	+.0819	+.015	J	5.209	5.2317	5.3269	-.0952	-.026
J	5.182	5.2349	5.1609	+.0740	-.028	J	5.247	5.2551	5.3299	-.0748	-.023
A	5.207	5.2305	5.1686	+.0619	-.059	A	5.229	5.2805	5.3331	-.0526	-.052
S	5.202	5.2222	5.1761	+.0461	-.036	S	5.290	5.3062	5.3364	-.0302	-.038
O	5.214	5.2106	5.1836	+.0270	+.015	O	5.359	5.3305	5.3393	-.0088	+.023
N	5.194	5.1961	5.1908	+.0053	+.024	N	5.424	5.3524	5.3424	+.0100	+.020
D	5.208	5.1796	5.1977	+.0181	+.029	D	5.412	5.3711	5.3453	+.0258	+.026
1900						1905					
J	5.134	5.1623	5.2045	-.0422	+.043	J	5.342	5.3862	5.3484	+.0378	+.055
F	5.157	5.1458	5.2111	-.0653	-.008	F	5.418	5.3978	5.3514	+.0464	-.013
M	5.190	5.1316	5.2172	-.0856	+.003	M	5.450	5.4061	5.3543	+.0518	-.000
A	5.172	5.1216	5.2232	-.1016	+.024	A	5.441	5.4115	5.3571	+.0544	+.020
M	5.148	5.1171	5.2288	-.1117	+.012	M	5.401	5.4148	5.3597	+.0551	+.004
J	5.130	5.1194	5.2338	-.1144	-.019	J	5.376	5.4167	5.3624	+.0543	-.025
J	5.086	5.1287	5.2389	-.1102	-.027	J	5.367	5.4177	5.3650	+.0527	-.023
A	5.071	5.1450	5.2434	-.0784	-.059	A	5.402	5.4187	5.3675	+.0512	-.049
S	5.059	5.1674	5.2477	-.0803	-.037	S	5.397	5.4203	5.3699	+.0504	-.038
O	5.133	5.1946	5.2515	-.0569	+.016	O	5.388	5.4229	5.3724	+.0505	+.025
N	5.256	5.2246	5.2550	-.0304	+.023	N	5.436	5.4267	5.3746	+.0521	+.018
D	5.255	5.2555	5.2582	-.0027	+.028	D	5.469	5.4317	5.3769	+.0548	+.026
1901						1906					
J	5.332	5.2852	5.2611	+.0241	+.046	J	5.503	5.4376	5.3790	+.0586	+.056
F	5.313	5.3115	5.2636	+.0479	-.010	F	5.486	5.4440	5.3812	+.0628	-.013
M	5.344	5.3325	5.2657	+.0668	+.003	M	5.433	5.4499	5.3833	+.0666	-.001
A	5.433	5.3472	5.2676	+.0796	+.026	A	5.439	5.4549	5.3853	+.0696	+.016
M	5.466	5.3547	5.2694	+.0853	+.012	M	5.452	5.4584	5.3872	+.0712	+.001
J	5.382	5.3551	5.2706	+.0845	-.025	J	5.439	5.4600	5.3891	+.0709	-.023
J	5.319	5.3490	5.2718	+.0772	-.026	J	5.391	5.4600	5.3908	+.0692	-.022
A	5.259	5.3380	5.2728	+.0652	-.058	A	5.501	5.4589	5.3924	+.0665	-.046
S	5.264	5.3242	5.2737	+.0505	-.038	S	5.479	5.4568	5.3938	+.0630	-.036
O	5.266	5.3101	5.2745	+.0356	+.017	O	5.452	5.4543	5.3954	+.0589	+.027
N	5.305	5.2978	5.2750	+.0228	+.022	N	5.441	5.4518	5.3966	+.0552	+.017
D	5.282	5.2892	5.2755	+.0137	+.027	D	5.449	5.4489	5.3977	+.0512	+.025

BANK CLEARINGS

A277

TABLE 28—Continued

BANK CLEARINGS IN NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1907						1912					
J	5.437	5.4447	5.3986	+.0461	+.056	J	5.409	5.4162	5.4187	-.0025	+.046
F	5.430	5.4389	5.3995	-.012	-.038	F	5.410	5.4202	5.4167	+.0035	-.009
M	5.491	5.4306	5.4002	+.0304	-.002	M	5.441	5.4250	5.4141	+.0109	-.007
A	5.395	5.4190	5.4006	+.0184	+.013	A	5.461	5.4301	5.4114	+.0187	+.008
M	5.376	5.4040	5.4009	+.0031	-.002	M	5.457	5.4353	5.4086	+.0267	-.005
J	5.347	5.3863	5.4010	-.0147	-.020	J	5.422	5.4400	5.4061	+.0339	+.002
J	5.394	5.3665	5.4009	-.0344	-.021	J	5.427	5.4440	5.4035	+.0405	-.020
A	5.391	5.3455	5.4008	-.0553	-.044	A	5.430	5.4464	5.4011	+.0453	-.047
S	5.338	5.3254	5.4005	-.0751	-.035	S	5.424	5.4473	5.3987	+.0486	-.030
O	5.394	5.3071	5.4000	-.0929	+.028	O	5.484	5.4466	5.3965	+.0501	+.031
N	5.247	5.2918	5.3996	-.1078	+.016	N	5.453	5.4441	5.3946	+.0495	+.015
D	5.213	5.2803	5.3989	-.1186	+.024	D	5.435	5.4400	5.3930	+.0470	+.019
1908						1913					
J	5.282	5.2736	5.3981	-.1245	+.056	J	5.436	5.4349	5.3915	+.0434	+.043
F	5.258	5.2714	5.3974	-.1260	-.011	F	5.455	5.4290	5.3902	+.0388	-.010
M	5.232	5.2739	5.3967	-.1228	-.003	M	5.415	5.4230	5.3894	+.0336	-.009
A	5.252	5.2809	5.3958	-.1149	+.010	A	5.420	5.4176	5.3889	+.0287	+.009
M	5.337	5.2918	5.3951	-.1033	-.004	M	5.415	5.4136	5.3888	+.0248	-.005
J	5.287	5.3055	5.3946	-.0891	-.015	J	5.407	5.4115	5.3889	+.0236	+.005
J	5.350	5.3216	5.3940	-.0724	-.021	J	5.394	5.4114	5.3894	+.0220	-.019
A	5.346	5.3390	5.3936	-.0546	-.043	A	5.387	5.4135	5.3901	+.0234	-.048
S	5.388	5.3565	5.3933	-.0368	-.034	S	5.424	5.4168	5.3914	+.0254	-.029
O	5.339	5.3733	5.3932	-.0199	+.029	O	5.417	5.4202	5.3929	+.0273	+.031
N	5.421	5.3890	5.3933	-.0043	+.015	N	5.386	5.4224	5.3948	+.0276	+.017
D	5.454	5.4030	5.3934	+.0096	+.022	D	5.392	5.4222	5.3970	+.0252	+.020
1909						1914					
J	5.402	5.4152	5.3936	+.0216	+.055	J	5.442	5.4182	5.3995	+.0187	+.038
F	5.401	5.4260	5.3941	+.0319	-.010	F	5.424	5.4100	5.4020	+.0080	-.012
M	5.387	5.4356	5.3947	+.0409	-.004	M	5.413	5.3979	5.4052	+.0073	-.010
A	5.450	5.4443	5.3954	+.0489	+.008	A	5.446	5.3825	5.4085	+.0260	+.009
M	5.423	5.4526	5.3963	+.0563	-.006	M	5.372	5.3649	5.4123	+.0474	-.004
J	5.493	5.4607	5.3974	+.0633	-.011	J	5.409	5.3468	5.4162	+.0694	+.008
J	5.450	5.4682	5.3987	+.0695	-.021	J	5.439	5.3297	5.4202	+.0905	-.018
A	5.490	5.4748	5.4000	+.0748	-.043	A	5.218	5.3150	5.4246	+.1096	-.048
S	5.484	5.4800	5.4014	+.0786	-.033	S	5.216	5.3043	5.4294	+.1251	-.028
O	5.482	5.4831	5.4029	+.0802	+.029	O	5.227	5.2986	5.4342	+.1356	+.031
N	5.466	5.4834	5.4045	+.0789	+.014	N	5.237	5.2987	5.4393	+.1406	+.018
D	5.484	5.4809	5.4062	+.0747	+.021	D	5.303	5.3056	5.4446	+.1390	+.021
1910						1915					
J	5.507	5.4753	5.4080	+.0673	+.053	J	5.337	5.3195	5.4501	+.1306	+.034
F	5.473	5.4669	5.4098	+.0571	-.005	F	5.380	5.3399	5.4557	+.1152	+.015
M	5.470	5.4563	5.4116	+.0447	+.007	M	5.397	5.3659	5.4616	+.0957	-.010
A	5.437	5.4444	5.4135	+.0309	-.006	A	5.460	5.3959	5.4677	+.0718	+.008
M	5.407	5.4317	5.4154	+.0163	-.006	M	5.448	5.4276	5.4739	+.0463	+.003
J	5.451	5.4195	5.4172	+.0023	-.006	J	5.417	5.4587	5.4802	+.0215	+.010
J	5.426	5.4086	5.4191	-.0105	-.021	J	5.465	5.4874	5.4868	+.0006	-.017
A	5.363	5.3996	5.4208	-.0212	-.044	A	5.488	5.5122	5.4936	+.0186	-.048
S	5.349	5.3929	5.4226	-.0297	-.032	S	5.532	5.5324	5.5006	+.0318	-.026
O	5.376	5.3888	5.4242	-.0354	+.030	O	5.584	5.5486	5.5079	+.0407	+.030
N	5.402	5.3870	5.4256	-.0386	+.014	N	5.577	5.5614	5.5153	+.0461	+.019
D	5.393	5.3872	5.4270	-.0398	+.020	D	5.577	5.5720	5.5225	+.0495	+.023
1911						1916					
J	5.390	5.3888	5.4280	-.0392	+.050	J	5.570	5.5815	5.5300	+.0515	+.029
F	5.424	5.3915	5.4288	-.0373	-.008	F	5.600	5.5907	5.5378	+.0529	-.017
M	5.397	5.3944	5.4293	-.0349	-.006	M	5.617	5.6000	5.5457	+.0543	-.010
A	5.359	5.3974	5.4295	-.0321	+.007	A	5.581	5.6092	5.5538	+.0554	+.007
M	5.415	5.4002	5.4295	-.0293	-.006	M	5.610	5.6184	5.5619	+.0565	-.002
J	5.440	5.4024	5.4291	-.0267	-.002	J	5.609	5.6275	5.5703	+.0572	+.013
J	5.406	5.4041	5.4284	-.0243	-.021	J	5.584	5.6364	5.5786	+.0578	-.017
A	5.422	5.4056	5.4276	-.0220	-.045	A	5.626	5.6455	5.5871	+.0584	-.047
S	5.410	5.4071	5.4263	-.0192	-.031	S	5.705	5.6550	5.5955	+.0595	-.025
O	5.354	5.4085	5.4247	-.0162	+.030	O	5.676	5.6647	5.6040	+.0607	+.029
N	5.415	5.4104	5.4230	-.0126	+.015	N	5.725	5.6748	5.6125	+.0623	+.019
D	5.399	5.4130	5.4211	-.0081	+.019	D	5.712	5.6847	5.6211	+.0636	+.025

TABLE 28—Continued

BANK CLEARINGS IN NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1917						1918					
J	5.662	5.6933	5.6297	+ .0636	+ .026	J	5.653	5.6736	5.7184	-.0448	+ .024
F	5.680	5.7000	5.6382	+ .0618	-.020	F	5.663	5.6730	5.7242	-.0512	-.022
M	5.672	5.7042	5.6465	+ .0577	-.010	M	5.659	5.6731	5.7293	-.0562	-.009
A	5.684	5.7055	5.6547	+ .0508	+ .005	A	5.668	5.6740	5.7340	-.0620	+ .004
M	5.702	5.7042	5.6628	+ .0414	-.001	M	5.701	5.6756	5.7385	-.0629	-.000
J	5.740	5.7007	5.6707	+ .0300	+ .016	J	5.677	5.6783	5.7426	-.0643	+ .018
J	5.705	5.6958	5.6783	+ .0175	-.015	J	5.710	5.6822	5.7465	-.0643	-.014
A	5.721	5.6904	5.6856	+ .0048	-.046	A	5.730	5.6873	5.7500	-.0627	-.046
S	5.690	5.6852	5.6929	-.0077	-.025	S	5.683	5.6937	5.7533	-.0596	-.025
O	5.677	5.6808	5.6999	-.0191	+ .028	O	5.711	5.7017	5.7564	-.0547	+ .026
N	5.676	5.6774	5.7064	-.0290	+ .018	N	5.699	5.7112	5.7591	-.0479	+ .017
D	5.646	5.6750	5.7124	-.0374	+ .027	D	5.701	5.7222	5.7616	-.0394	+ .029
						1919					
						J	5.738	5.7349	5.7639	-.0290	+ .023

BANK DEBITS IN NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1919						1922					
J	5.744	5.7410	5.7699	-.0289	+ .023	J	5.767	5.7856	5.7997	-.0141	+ .022
F	5.738	5.7553	5.7720	-.0167	-.024	F	5.791	5.7960	5.7998	-.0038	-.020
M	5.738	5.7712	5.7740	-.0028	-.007	M	5.816	5.8054	5.7999	+ .0055	+ .002
A	5.759	5.7880	5.7759	+ .0121	+ .003	A	5.836	5.8135	5.8002	+ .0133	+ .003
M	5.817	5.8053	5.7778	+ .0275	-.000	M	5.843	5.8205	5.8007	+ .0198	+ .001
J	5.837	5.8220	5.7795	+ .0425	+ .020	J	5.842	5.8262	5.8011	+ .0251	+ .025
J	5.873	5.8372	5.7812	+ .0560	-.014	J	5.818	5.8308	5.8017	+ .0291	-.015
A	5.861	5.8500	5.7827	+ .0673	-.045	A	5.817	5.8341	5.8025	+ .0316	-.046
S	5.858	5.8594	5.7842	+ .0752	-.025	S	5.834	5.8360	5.8034	+ .0326	-.027
O	5.871	5.8650	5.7856	+ .0794	+ .022	O	5.846	5.8362	5.8045	+ .0317	+ .011
N	5.877	5.8667	5.7869	+ .0798	+ .014	N	5.796	5.8348	5.8057	+ .0291	+ .006
D	5.873	5.8648	5.7882	+ .0766	+ .031	D	5.793	5.8319	5.8070	+ .0249	+ .035
1920						1923					
J	5.860	5.8599	5.7895	+ .0704	+ .022	J	5.832	5.8278	5.8085	+ .0193	+ .021
F	5.817	5.8528	5.7906	+ .0622	-.023	F	5.850	5.8229	5.8103	+ .0126	-.018
M	5.861	5.8445	5.7917	+ .0528	-.004	M	5.857	5.8179	5.8122	+ .0057	+ .005
A	5.849	5.8358	5.7927	+ .0431	+ .003	A	5.830	5.8134	5.8143	-.0009	+ .004
M	5.799	5.8273	5.7938	+ .0335	+ .001	M	5.824	5.8094	5.8166	-.0072	+ .001
J	5.798	5.8194	5.7946	+ .0248	+ .022	J	5.820	5.8064	5.8190	-.0126	+ .026
J	5.803	5.8122	5.7953	+ .0169	-.014	J	5.788	5.8045	5.8217	-.0172	-.016
A	5.794	5.8055	5.7961	+ .0094	-.046	A	5.764	5.8034	5.8247	-.0213	-.046
S	5.794	5.7993	5.7967	+ .0026	-.026	S	5.769	5.8032	5.8277	-.0245	-.028
O	5.794	5.7932	5.7972	-.0040	+ .019	O	5.783	5.8040	5.8307	-.0267	+ .008
N	5.817	5.7869	5.7976	+ .0107	+ .011	N	5.820	5.8060	5.8340	-.0280	+ .004
D	5.826	5.7802	5.7980	-.0178	+ .033	D	5.818	5.8092	5.8376	-.0284	+ .035
1921						1924					
J	5.788	5.7732	5.7984	-.0252	+ .022	J	5.832	5.8138	5.8412	-.0274	+ .021
F	5.756	5.7660	5.7988	-.0328	-.023	F	5.852	5.8198	5.8448	-.0250	-.016
M	5.750	5.7587	5.7990	-.0403	-.002	M	5.833	5.8269	5.8487	-.0218	+ .009
A	5.733	5.7519	5.7992	-.0473	+ .003	A	5.832	5.8350	5.8524	-.0174	+ .006
M	5.742	5.7464	5.7992	-.0528	+ .001	M	5.838	5.8436	5.8563	-.0127	+ .001
J	5.748	5.7427	5.7993	-.0566	+ .024	J	5.838	5.8522	5.8602	-.0080	+ .026
J	5.737	5.7414	5.7993	-.0579	-.015	J	5.857	5.8606	5.8640	-.0034	-.017
A	5.736	5.7431	5.7994	-.0563	-.046	A	5.875	5.8685	5.8678	+ .0007	-.046
S	5.756	5.7477	5.7994	-.0517	-.026	S	5.868	5.8758	5.8720	+ .0038	-.028
O	5.739	5.7550	5.7994	-.0444	+ .015	O	5.855	5.8826	5.8759	+ .0067	+ .006
N	5.758	5.7643	5.7995	-.0352	+ .008	N	5.882	5.8891	5.8800	+ .0091	+ .003
D	5.788	5.7749	5.7996	-.0247	+ .034	D	5.911	5.8954	5.8841	+ .0113	+ .034

BANK CLEARINGS

A279

TABLE 28—Continued

BANK DEBITS IN NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1925						1930					
J	5.931	5.9015	5.8881	+ .0134	+ .020	F	6.031	6.1399			+ .018
F	5.927	5.9076	5.8925	+ .0151	+ .014	F	6.056	6.1180			+ .010
M	5.918	5.9136	5.8966	+ .0170	+ .012	M	6.079	6.0943			+ .020
A	5.895	5.9195	5.9008	+ .0187	+ .007	A	6.100	6.0699			+ .010
M	5.926	5.9253	5.9051	+ .0202	+ .001	M	6.082	6.0457			+ .000
J	5.927	5.9310	5.9097	+ .0213	+ .026	J	6.074	6.0228			+ .025
J	5.932	5.9366	5.9144	+ .0222	+ .018	J	6.001	6.0021			+ .021
A	5.921	5.9421	5.9193	+ .0227	+ .046	A	5.954	5.9844			+ .047
S	5.939	5.9474	5.9242	+ .0232	+ .029	S	5.990	5.9697			+ .030
O	5.966	5.9524	5.9297	+ .0227	+ .004	O	5.997	5.9573			+ .000
N	5.952	5.9568	5.9351	+ .0217	+ .032	N	5.875	5.9468			+ .000
D	5.957	5.9604	5.9407	+ .0197	+ .033	D	5.941	5.9373			+ .030
1926						1931					
J	5.973	5.9631	5.9464	+ .0167	+ .020	J	5.881	5.9279			+ .018
F	5.960	5.9647	5.9527	+ .0120	+ .012	F	5.884	5.9181			+ .010
M	5.912	5.9655	5.9591	+ .0364	+ .015	M	5.929	5.9077			+ .020
A	5.982	5.9655	5.9658	+ .0003	+ .008	A	5.941	5.8962			+ .010
M	5.932	5.9650	5.9723	+ .0073	+ .001	M	5.908	5.8835			+ .000
J	5.947	5.9643	5.9796	+ .0153	+ .026	J	5.911	5.8695			+ .025
J	5.969	5.9640	5.9866	+ .0226	+ .019	J	5.852	5.8537			+ .021
S	5.973	5.9645	5.9937	+ .0292	+ .046	S	5.799	5.8362			+ .047
S	5.960	5.9661	6.0010	+ .0349	+ .027	S	5.855	5.8170			+ .030
O	5.964	5.9691	6.0085	+ .0394	+ .003	O	5.824	5.7967			+ .000
N	5.933	5.9732	6.0162	+ .0430	+ .001	N	5.683	5.7753			+ .000
D	5.990	5.9786	6.0239	+ .0453	+ .032	D	5.763	5.7543			+ .030
1927						1932					
J	5.985	5.9849	6.0311	+ .0464	+ .019	J	5.738	5.7336			+ .018
F	6.002	5.9918	6.0388	+ .0470	+ .011	F	5.705	5.7139			+ .010
M	6.029	5.9991	6.0462	+ .0471	+ .017	M	5.697	5.6954			+ .020
A	6.019	6.0069	6.0534	+ .0465	+ .007	A	5.705	5.6781			+ .010
M	6.003	6.0150	6.0605	+ .0455	+ .001	M	5.620	5.6624			+ .000
J	6.016	6.0233	6.0676	+ .0443	+ .026	J	5.650	5.6485			+ .025
J	6.016	6.0319	6.0743	+ .0424	+ .020	J	5.634	5.6368			+ .021
A	6.055	6.0406	6.0811	+ .0405	+ .046	A	5.685	5.6279			+ .047
S	6.076	6.0492	6.0874	+ .0382	+ .030	S	5.704	5.6219			+ .030
O	6.039	6.0576	6.0936	+ .0360	+ .002	O	5.621	5.6188			+ .000
N	6.044	6.0657	6.0994	+ .0337	+ .001	N	5.515	5.6186			+ .000
D	6.068	6.0736	6.1051	+ .0315	+ .031	D	5.624	5.6204			+ .030
1928						1933					
J	6.068	6.0815	6.1104	+ .0289	+ .019	J	5.585	5.6235			+ .018
F	6.063	6.0898	6.1153	+ .0255	+ .010	F	5.643	5.6275			+ .010
M	6.141	6.0986	6.1199	+ .0213	+ .019	M	*	5.6318			+ .020
A	6.134	6.1078	6.1242	+ .0164	+ .010	A	5.592	5.6362			+ .010
M	6.163	6.1175	6.1278	+ .0103	+ .001	M	5.654	5.6408			+ .000
J	6.154	6.1273	6.1312	+ .0039	+ .026	J	5.722	5.6459			+ .025
J	6.074	6.1368	6.1339	+ .0029	+ .020	J	5.769	5.6515			+ .021
A	6.101	6.1461	6.1362	+ .0079	+ .047	A	5.672	5.6373			+ .047
S	6.141	6.1554	6.1380	+ .0174	+ .030	S	5.644	5.6627			+ .030
O	6.163	6.1648	6.1392	+ .0256	+ .001	O	5.632	5.6673			+ .000
N	6.181	6.1747	6.1398	+ .0349	+ .000	N	5.609	5.6701			+ .000
D	6.200	6.1853	6.1397	+ .0456	+ .031	D	5.593	5.6708			+ .030
1929						1934					
J	6.228	6.1963	6.1392	+ .0571	+ .019	J	5.637	5.6695			+ .018
F	6.228	6.2069	6.1377	+ .0692	+ .010	F	5.684	5.6664			+ .010
M	6.232	6.2165	6.1357	+ .0808	+ .020	M	5.682	5.6622			+ .020
A	6.194	6.2238	6.1332	+ .0906	+ .010	A	5.742	5.6578			+ .010
M	6.208	6.2279	6.1299	+ .0980	+ .000	M	5.675				+ .000
J	6.133	6.2281			+ .026	J	5.685				+ .025
J	6.222	6.2245			+ .021	J	5.671				+ .021
A	6.245	6.2172			+ .047	A	5.645				+ .047
S	6.255	6.2065			+ .030	S	5.603				+ .030
O	6.309	6.1932			+ .001	O	5.598				+ .000
N	6.252	6.1777			+ .000	N	5.578				+ .000
D	6.079	6.1598			+ .030	D	5.661				+ .030

*Not available, complete data not having been reported on account of bank holidays.

TABLE 28—Concluded

BANK DEBITS IN NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1935						1936					
J	5.667				+.018	J	5.744				+.018
F	5.661				-.010						
M	5.690				+.020						
A	5.714				+.010						
M	5.672				+.000						
J	5.693				+.025						
J	5.753				-.021						
A	5.724				-.047						
S	5.699				-.030						
O	5.705				.000						
N	5.714				.000						
D	5.726				+.030						

TABLE 29

DAILY AVERAGE BANK CLEARINGS OUTSIDE NEW YORK CITY,¹ MONTHLY,
JANUARY 1875-JANUARY 1919, INCLUSIVE; DAILY AVERAGE
BANK DEBITS FOR 140 OUTSIDE CITIES, MONTHLY,
JANUARY 1919-JANUARY 1936

- Col. 1. Logarithms of Data (in thousands of dollars) Adjusted for Seasonal Fluctuations.
- Col. 2. Cyclical Curve (logarithms).
- Col. 3. Trend Curve (logarithms).
- Col. 4. Deviations of Cyclical Curve (logarithms)
from Trend Curve (logarithms).
- Col. 5. Changing Seasonal Fluctuations (logarithms).

For details of the nature of the graduations given in Columns 2 and 3 and of the seasonal given in Column 5 of this table, see Appendix D.

¹See Table 27.

TABLE 29

BANK CLEARINGS OUTSIDE NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1875						1880					
J	4.458	4.4802	4.4948	-.0146	+.031	J	4.568	4.5506	4.5281	+.0225	+.031
F	4.473	4.4796	4.4927	-.0131	-.007	F	4.565	4.5557	4.5341	+.0216	+.009
M	4.455	4.4793	4.4903	-.0108	+.005	M	4.582	4.5590	4.5402	+.0188	-.012
A	4.400	4.4799	4.4880	-.0081	-.010	A	4.583	4.5611	4.5462	+.0149	-.006
M	4.468	4.4806	4.4853	-.0047	-.003	M	4.545	4.5622	4.5521	+.0101	-.005
J	4.529	4.4815	4.4829	-.0014	-.005	J	4.540	4.5631	4.5584	+.0047	-.006
J	4.470	4.4822	4.4802	+.0020	-.026	J	4.558	4.5643	4.5644	-.0001	-.024
A	4.502	4.4822	4.4775	+.0047	-.041	A	4.556	4.5666	4.5702	-.0036	-.043
S	4.46	4.4814	4.4746	+.0068	-.031	S	4.558	4.5705	4.5761	-.0056	-.024
O	4.440	4.4797	4.4719	+.0078	+.033	O	4.544	4.5765	4.5818	-.0053	+.037
N	4.505	4.4771	4.4691	+.0080	+.046	N	4.597	4.5849	4.5875	-.0026	+.038
D	4.460	4.4739	4.4664	+.0075	+.009	D	4.623	4.5954	4.5931	+.0023	+.026
1876						1881					
J	4.470	4.4705	4.4636	+.0069	+.032	J	4.611	4.6075	4.5987	+.0088	+.029
F	4.462	4.4672	4.4609	+.0063	-.007	F	4.633	4.6205	4.6038	+.0167	-.011
M	4.500	4.4644	4.4583	+.0061	-.002	M	4.617	4.6333	4.6089	-.0244	-.014
A	4.436	4.4623	4.4558	+.0065	-.009	A	4.626	4.6448	4.6138	+.0310	-.005
M	4.453	4.4607	4.4532	+.0075	-.003	M	4.654	4.6544	4.6185	+.0359	-.004
J	4.484	4.4595	4.4510	+.0085	-.006	J	4.698	4.6614	4.6228	+.0386	-.004
J	4.439	4.4584	4.4487	+.0097	-.027	J	4.624	4.6657	4.6269	+.0388	-.022
A	4.485	4.4571	4.4465	+.0106	-.041	A	4.700	4.6676	4.6307	+.0369	-.043
S	4.446	4.4556	4.4444	+.0112	-.031	S	4.688	4.6675	4.6342	+.0333	-.022
O	4.428	4.4538	4.4426	+.0112	+.034	O	4.672	4.6659	4.6374	+.0285	+.037
N	4.459	4.4520	4.4408	+.0102	+.044	N	4.659	4.6634	4.6402	+.0232	+.036
D	4.460	4.4502	4.4391	+.0111	+.013	D	4.663	4.6605	4.6428	+.0177	+.027
1877						1882					
J	4.441	4.4487	4.4375	+.0112	+.033	J	4.639	4.6575	4.6451	+.0124	+.027
F	4.456	4.4477	4.4363	+.0114	-.007	F	4.641	4.6547	4.6470	+.0077	-.012
M	4.458	4.4468	4.4351	+.0117	-.002	M	4.641	4.6524	4.6487	+.0037	-.016
A	4.434	4.4462	4.4342	+.0120	-.009	A	4.644	4.6505	4.6500	-.0005	-.005
M	4.477	4.4455	4.4333	+.0122	-.004	M	4.641	4.6493	4.6510	-.0017	-.017
J	4.406	4.4443	4.4327	+.0116	-.006	J	4.649	4.6489	4.6517	-.0028	-.003
J	4.427	4.4425	4.4323	+.0102	-.028	J	4.661	4.6493	4.6522	-.0029	-.019
A	4.446	4.4402	4.4322	+.0080	-.041	A	4.663	4.6504	4.6523	-.0019	-.044
S	4.445	4.4373	4.4322	+.0051	-.030	S	4.679	4.6522	4.6523	-.0001	-.021
O	4.429	4.4341	4.4326	+.0015	+.035	O	4.646	4.6542	4.6521	+.0021	+.038
N	4.447	4.4309	4.4331	-.0022	+.042	N	4.661	4.6563	4.6517	+.0046	+.034
D	4.429	4.4276	4.4337	-.0061	-.018	D	4.641	4.6579	4.6510	+.0069	+.027
1878						1883					
J	4.475	4.4246	4.4337	-.0101	+.033	J	4.657	4.6591	4.6502	+.0089	+.025
F	4.406	4.4218	4.4358	-.0140	-.007	F	4.660	4.6596	4.6493	+.0103	-.014
M	4.379	4.4193	4.4373	-.0180	-.005	M	4.661	4.6596	4.6483	+.0113	-.017
A	4.398	4.4169	4.4392	-.0223	-.008	A	4.639	4.6592	4.6472	+.0120	-.004
M	4.423	4.4149	4.4411	-.0262	-.004	M	4.664	4.6588	4.6459	+.0129	-.004
J	4.383	4.4133	4.4435	-.0302	-.006	J	4.673	4.6584	4.6446	+.0138	-.001
J	4.453	4.4122	4.4461	-.0339	-.027	J	4.660	4.6582	4.6433	+.0149	-.017
A	4.394	4.4116	4.4488	-.0372	-.042	A	4.668	4.6579	4.6421	+.0158	-.045
S	4.436	4.4119	4.4517	-.0398	-.028	S	4.652	4.6574	4.6409	+.0165	-.020
O	4.456	4.4131	4.4548	-.0417	+.035	O	4.654	4.6562	4.6397	+.0165	+.038
N	4.390	4.4151	4.4583	-.0432	+.041	N	4.641	4.6544	4.6385	+.0159	+.033
D	4.390	4.4183	4.4620	-.0437	+.021	D	4.644	4.6515	4.6374	+.0141	+.027
1879						1884					
J	4.435	4.4226	4.4662	-.0436	+.033	J	4.648	4.6486	4.6364	+.0122	+.022
F	4.437	4.4282	4.4704	-.0422	-.008	F	4.642	4.6437	4.6355	+.0082	-.015
M	4.407	4.4355	4.4748	-.0393	-.009	M	4.633	4.6381	4.6347	+.0034	-.018
A	4.482	4.4446	4.4795	-.0349	-.007	A	4.637	4.6316	4.6339	-.0023	-.003
M	4.442	4.4554	4.4843	-.0289	-.004	M	4.660	4.6249	4.6332	-.0083	-.003
J	4.453	4.4892	4.4992	-.0313	-.006	J	4.594	4.6170	4.6326	-.0156	+.001
J	4.507	4.4816	4.4943	-.0127	-.026	J	4.602	4.6103	4.6322	-.0219	-.015
A	4.441	4.4958	4.4997	-.0039	-.042	A	4.594	4.6039	4.6320	-.0281	-.045
S	4.481	4.5097	4.5052	+.0045	-.027	S	4.597	4.5981	4.6320	-.0339	-.020
O	4.570	4.5227	4.5109	+.0118	+.036	O	4.591	4.5931	4.6320	-.0389	+.038
N	4.536	4.5339	4.5167	+.0172	+.039	N	4.563	4.5892	4.6322	-.0430	+.032
D	4.544	4.5433	4.5223	+.0210	+.024	D	4.606	4.5867	4.6326	-.0459	+.027

BANK CLEARINGS

A283

TABLE 29—Continued

BANK CLEARINGS OUTSIDE NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1885						1890					
J	4.608	4.5860	4.6331	-.0471	+.020	J	4.820	4.8134	4.8092	+.0042	+.017
F	4.580	4.5871	4.6338	-.0467	-.016	F	4.813	4.8211	4.8119	+.0092	+.017
M	4.584	4.5901	4.6348	-.0447	-.018	M	4.817	4.8283	4.8146	+.0137	+.018
A	4.606	4.5946	4.6359	-.0413	-.002	A	4.833	4.8346	4.8172	+.0174	+.001
M	4.579	4.6003	4.6371	-.0368	-.002	M	4.860	4.8396	4.8198	+.0198	+.004
J	4.612	4.6069	4.6385	-.0316	+.002	J	4.838	4.8429	4.8221	+.0208	+.003
J	4.631	4.6140	4.6400	-.0260	-.014	J	4.853	4.8445	4.8244	+.0201	-.013
A	4.598	4.6211	4.6417	-.0206	-.045	A	4.849	4.8443	4.8267	+.0176	-.046
S	4.618	4.6282	4.6437	-.0155	-.020	S	4.856	4.8424	4.8289	+.0135	-.023
O	4.640	4.6351	4.6457	-.0106	+.038	O	4.854	4.8392	4.8308	+.0084	+.036
N	4.656	4.6416	4.6479	-.0063	+.031	N	4.837	4.8352	4.8328	+.0024	+.030
D	4.666	4.6478	4.6502	-.0024	+.026	D	4.813	4.8309	4.8344	-.0035	+.024
1886						1891					
J	4.646	4.6534	4.6526	+.0008	+.018	J	4.819	4.8267	4.8359	-.0092	+.018
F	4.664	4.6585	4.6553	+.0032	-.017	F	4.817	4.8232	4.8372	-.0140	-.016
M	4.681	4.6629	4.6580	+.0049	-.018	M	4.804	4.8208	4.8384	-.0176	-.018
A	4.652	4.6670	4.6608	+.0062	-.002	A	4.828	4.8197	4.8396	-.0199	+.002
M	4.642	4.6709	4.6636	+.0073	-.001	M	4.810	4.8200	4.8404	-.0204	+.004
J	4.678	4.6748	4.6665	+.0083	+.003	J	4.809	4.8217	4.8413	-.0196	+.003
J	4.695	4.6791	4.6697	+.0094	-.013	J	4.829	4.8253	4.8420	-.0167	-.013
A	4.683	4.6842	4.6729	+.0113	-.045	A	4.830	4.8291	4.8424	-.0133	-.046
S	4.694	4.6900	4.6762	+.0138	-.040	S	4.870	4.8333	4.8426	-.0093	-.025
O	4.682	4.6966	4.6795	+.0171	+.038	O	4.844	4.8376	4.8428	-.0052	+.035
N	4.708	4.7038	4.6830	+.0208	+.031	N	4.829	4.8416	4.8429	-.0013	+.031
D	4.720	4.7112	4.6866	+.0246	+.026	D	4.840	4.8444	4.8428	+.0016	+.025
1887						1892					
J	4.691	4.7183	4.6902	+.0281	+.017	J	4.838	4.8475	4.8426	+.0049	+.019
F	4.707	4.7248	4.6939	+.0300	-.017	F	4.873	4.8503	4.8423	+.0080	-.016
M	4.752	4.7303	4.6977	+.0326	-.018	M	4.859	4.8533	4.8419	+.0114	-.017
A	4.745	4.7343	4.7015	+.0328	-.001	A	4.849	4.8569	4.8412	+.0157	+.002
M	4.738	4.7371	4.7054	+.0317	.000	M	4.840	4.8613	4.8408	+.0205	+.005
J	4.767	4.7384	4.7093	+.0291	+.004	J	4.873	4.8666	4.8400	+.0266	+.002
J	4.727	4.7383	4.7132	+.0251	-.012	J	4.861	4.8726	4.8393	+.0333	-.014
A	4.735	4.7371	4.7171	+.0200	-.045	A	4.879	4.8788	4.8385	+.0403	-.046
S	4.738	4.7352	4.7210	+.0142	-.020	S	4.882	4.8842	4.8375	+.0467	-.026
O	4.714	4.7327	4.7248	+.0079	+.038	O	4.869	4.8880	4.8366	+.0514	+.034
N	4.747	4.7302	4.7286	+.0016	+.030	N	4.882	4.8900	4.8355	+.0545	+.031
D	4.724	4.7281	4.7324	-.0043	+.025	D	4.891	4.8884	4.8342	+.0542	+.025
1888						1893					
J	4.716	4.7267	4.7362	-.0095	+.016	J	4.888	4.8834	4.8329	+.0505	+.020
F	4.729	4.7264	4.7399	-.0135	-.017	F	4.894	4.8753	4.8317	+.0436	-.015
M	4.716	4.7273	4.7435	-.0162	-.018	M	4.883	4.8644	4.8303	+.0341	-.016
A	4.725	4.7295	4.7470	-.0175	.000	A	4.873	4.8506	4.8289	+.0217	+.003
M	4.742	4.7329	4.7503	-.0174	+.001	M	4.874	4.8362	4.8272	+.0090	+.004
J	4.734	4.7371	4.7537	-.0166	+.004	J	4.827	4.8212	4.8257	-.0045	+.002
J	4.736	4.7420	4.7569	-.0149	-.012	J	4.791	4.8065	4.8239	-.0174	-.015
A	4.758	4.7473	4.7600	-.0127	-.046	A	4.723	4.7927	4.8223	-.0296	-.046
S	4.747	4.7525	4.7630	-.0105	-.021	S	4.746	4.7806	4.8208	-.0402	-.027
O	4.781	4.7575	4.7659	-.0084	+.037	O	4.754	4.7708	4.8193	-.0485	+.033
N	4.754	4.7620	4.7689	-.0069	+.030	N	4.779	4.7639	4.8177	-.0538	+.031
D	4.759	4.7658	4.7718	-.0060	+.024	D	4.774	4.7601	4.8162	-.0561	+.026
1889						1894					
J	4.774	4.7690	4.7748	-.0058	+.017	J	4.784	4.7593	4.8146	-.0553	+.021
F	4.778	4.7714	4.7776	-.0062	-.017	F	4.759	4.7611	4.8130	-.0519	-.015
M	4.773	4.7733	4.7806	-.0073	-.018	M	4.776	4.7648	4.8116	-.0468	-.015
A	4.762	4.7749	4.7836	-.0087	+.001	A	4.771	4.7696	4.8101	-.0405	+.004
M	4.778	4.7763	4.7863	-.0100	+.003	M	4.780	4.7747	4.8089	-.0342	+.004
J	4.773	4.7779	4.7893	-.0114	+.003	J	4.772	4.7794	4.8076	-.0282	+.002
J	4.799	4.7801	4.7921	-.0120	-.012	J	4.768	4.7833	4.8064	-.0231	-.016
A	4.786	4.7831	4.7950	-.0119	-.046	A	4.804	4.7864	4.8052	-.0188	-.046
S	4.773	4.7872	4.7978	-.0106	-.022	S	4.790	4.7891	4.8042	-.0151	-.027
O	4.800	4.7924	4.8005	-.0081	+.037	O	4.800	4.7917	4.8032	-.0115	+.031
N	4.795	4.7987	4.8034	-.0047	+.030	N	4.799	4.7947	4.8022	-.0075	+.030
D	4.789	4.8058	4.8063	-.0005	+.024	D	4.798	4.7985	4.8013	-.0028	+.027

TABLE 29—Continued

BANK CLEARINGS OUTSIDE NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1895						1900					
J	4,810	4,8030	4,8006	+ .0024	+ .022	J	4,969	4,9758	4,9743	+ .0015	+ .026
F	4,776	4,8082	4,8000	+ .0082	- .014	F	4,972	4,9729	4,9787	- .0058	- .011
M	4,797	4,8138	4,7995	+ .0143	- .004	M	4,973	4,9702	4,9830	- .0128	- .006
A	4,814	4,8194	4,7990	+ .0204	+ .004	A	4,968	4,9682	4,9872	- .0190	+ .008
M	4,833	4,8246	4,7985	+ .0261	+ .003	M	4,975	4,9672	4,9912	- .0240	- .002
J	4,824	4,8292	4,7983	+ .0309	+ .002	J	4,981	4,9675	4,9952	- .0277	- .000
J	4,854	4,8330	4,7981	+ .0349	- .016	J	4,968	4,9694	4,9991	- .0297	- .015
A	4,837	4,8356	4,7982	+ .0374	- .047	A	4,970	4,9730	5,0028	- .0298	- .047
S	4,827	4,8370	4,7983	+ .0387	- .028	S	4,956	4,9783	5,0063	- .0280	- .028
O	4,862	4,8370	4,7987	+ .0383	+ .030	O	4,979	4,9851	5,0098	- .0247	+ .026
N	4,845	4,8356	4,7994	+ .0462	+ .030	N	4,995	4,9931	5,0131	- .0200	+ .025
D	4,837	4,8328	4,8002	+ .0326	+ .028	D	4,993	5,0017	5,0164	- .0147	+ .024
1896						1901					
J	4,818	4,8288	4,8011	+ .0277	+ .022	J	5,016	5,0106	5,0194	- .0088	+ .026
F	4,809	4,8238	4,8023	+ .0215	- .013	F	5,014	5,0192	5,0224	- .0032	- .010
M	4,800	4,8183	4,8038	+ .0145	- .014	M	5,020	5,0272	5,0252	+ .0020	- .005
A	4,815	4,8125	4,8054	+ .0071	+ .005	A	5,056	5,0342	5,0280	+ .0062	+ .008
M	4,802	4,8069	4,8071	- .0002	+ .002	M	5,069	5,0403	5,0306	+ .0097	- .003
J	4,815	4,8017	4,8093	- .0076	+ .001	J	5,047	5,0451	5,0332	+ .0119	- .004
J	4,819	4,7971	4,8114	- .0143	- .016	J	5,052	5,0488	5,0357	+ .0131	- .014
A	4,774	4,7935	4,8137	- .0202	- .047	A	5,054	5,0515	5,0381	- .0134	- .047
S	4,784	4,7909	4,8163	- .0254	- .028	S	5,029	5,0533	5,0402	+ .0131	- .028
O	4,795	4,7894	4,8189	- .0295	+ .029	O	5,049	5,0546	5,0426	+ .0120	+ .026
N	4,796	4,7893	4,8216	- .0323	+ .029	N	5,053	5,0556	5,0447	+ .0109	+ .024
D	4,812	4,7906	4,8247	- .0341	+ .028	D	5,041	5,0567	5,0467	+ .0100	+ .023
1897						1902					
J	4,784	4,7934	4,8279	- .0345	+ .023	J	5,067	5,0580	5,0486	+ .0094	+ .027
F	4,798	4,7978	4,8310	- .0332	- .013	F	5,055	5,0597	5,0504	+ .0093	- .010
M	4,798	4,8037	4,8344	- .0307	- .011	M	5,054	5,0617	5,0523	+ .0094	- .003
A	4,803	4,8109	4,8378	- .0269	+ .006	A	5,081	5,0641	5,0543	+ .0098	+ .008
M	4,793	4,8192	4,8410	- .0218	+ .001	M	5,081	5,0665	5,0563	+ .0102	- .005
J	4,818	4,8283	4,8445	- .0162	+ .001	J	5,048	5,0690	5,0582	+ .0108	- .001
J	4,838	4,8376	4,8479	- .0103	- .016	J	5,090	5,0713	5,0600	+ .0113	- .014
A	4,853	4,8466	4,8514	- .0048	- .049	A	5,063	5,0734	5,0618	+ .0116	- .046
S	4,894	4,8547	4,8550	- .0003	- .028	S	5,089	5,0752	5,0637	+ .0115	- .027
O	4,858	4,8616	4,8584	+ .0032	+ .027	O	5,083	5,0769	5,0656	+ .0113	+ .023
N	4,867	4,8668	4,8620	+ .0048	- .028	N	5,063	5,0785	5,0675	+ .0110	+ .026
D	4,873	4,8702	4,8658	+ .0044	+ .028	D	5,071	5,0801	5,0694	+ .0107	+ .022
1898						1903					
J	4,867	4,8721	4,8696	+ .0025	+ .024	J	5,084	5,0816	5,0712	+ .0104	+ .027
F	4,890	4,8727	4,8733	- .0006	- .012	F	5,083	5,0832	5,0731	+ .0101	- .010
M	4,883	4,8727	4,8771	- .0044	- .010	M	5,075	5,0847	5,0751	+ .0096	- .002
A	4,857	4,8727	4,8810	- .0083	+ .006	A	5,087	5,0859	5,0772	+ .0087	+ .008
M	4,866	4,8737	4,8849	- .0112	- .000	M	5,075	5,0866	5,0794	+ .0072	- .006
J	4,888	4,8756	4,8887	- .0131	+ .001	J	5,101	5,0868	5,0816	+ .0052	- .002
J	4,851	4,8795	4,8929	- .0134	- .016	J	5,105	5,0863	5,0839	+ .0024	- .013
A	4,892	4,8855	4,8971	- .0116	- .048	A	5,079	5,0850	5,0864	- .0014	- .046
S	4,888	4,8928	4,9014	- .0086	- .029	S	5,090	5,0831	5,0888	- .0057	- .027
O	4,878	4,9024	4,9057	- .0033	+ .027	O	5,090	5,0806	5,0914	- .0108	+ .026
N	4,911	4,9133	4,9101	+ .0032	+ .027	N	5,064	5,0779	5,0939	- .0160	+ .022
D	4,931	4,9249	4,9146	+ .0103	+ .027	D	5,078	5,0753	5,0966	- .0213	+ .021
1899						1904					
J	4,946	4,9366	4,9190	+ .0176	+ .025	J	5,067	5,0731	5,0991	- .0260	+ .027
F	4,966	4,9483	4,9237	+ .0246	- .012	F	5,076	5,0718	5,1018	- .0300	- .010
M	4,983	4,9586	4,9283	+ .0303	- .008	M	5,076	5,0717	5,1045	- .0328	- .001
A	4,963	4,9674	4,9329	+ .0345	+ .007	A	5,074	5,0730	5,1072	- .0342	+ .008
M	4,972	4,9745	4,9374	+ .0371	- .001	M	5,057	5,0756	5,1101	- .0345	- .008
J	4,972	4,9797	4,9419	+ .0378	+ .001	J	5,080	5,0796	5,1128	- .0332	- .002
J	4,970	4,9830	4,9467	+ .0363	- .016	J	5,074	5,0847	5,1157	- .0310	- .013
A	4,982	4,9846	4,9514	+ .0332	- .048	A	5,091	5,0906	5,1184	- .0278	- .045
S	4,994	4,9846	4,9561	+ .0285	- .029	S	5,104	5,0970	5,1211	- .0241	- .026
O	4,985	4,9834	4,9606	+ .0228	+ .026	O	5,101	5,1035	5,1238	- .0203	+ .026
N	4,982	4,9814	4,9651	+ .0163	+ .026	N	5,133	5,1100	5,1265	- .0165	+ .022
D	4,977	4,9788	4,9697	+ .0091	+ .026	D	5,135	5,1163	5,1292	- .0129	+ .020

BANK CLEARINGS

A285

TABLE 29—Continued

BANK CLEARINGS OUTSIDE NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1905						1910					
J	5.106	5.1222	5.1319	-.0097	+.027	J	5.260	5.2671	5.2402	+.0269	+.025
F	5.121	5.1279	5.1344	-.0065	-.010	F	5.263	5.2685	5.2426	+.0259	+.009
M	5.140	5.1333	5.1370	-.0037	+.001	M	5.285	5.2692	5.2450	+.0242	+.006
A	5.133	5.1385	5.1396	-.0011	+.008	A	5.274	5.2692	5.2477	+.0215	+.008
M	5.149	5.1437	5.1421	+.0016	-.009	M	5.256	5.2687	5.2502	+.0185	-.014
J	5.147	5.1488	5.1443	-.0043	-.003	J	5.270	5.2668	5.2529	-.0139	-.005
J	5.136	5.1337	5.1469	+.0068	-.012	J	5.259	5.2656	5.2535	+.0101	-.012
A	5.157	5.1584	5.1493	+.0091	-.044	A	5.261	5.2644	5.2581	+.0063	-.044
S	5.164	5.1628	5.1518	+.0110	-.026	S	5.262	5.2634	5.2607	+.0027	-.023
S	5.156	5.1669	5.1541	+.0128	+.026	O	5.256	5.2625	5.2634	-.0008	+.028
N	5.175	5.1705	5.1564	+.0141	+.022	N	5.269	5.2622	5.2660	-.0038	+.022
D	5.178	5.1737	5.1586	+.0151	+.019	D	5.267	5.2621	5.2687	-.0066	+.019
1906						1911					
J	5.201	5.1766	5.1608	+.0158	+.027	J	5.262	5.2625	5.2713	-.0088	+.024
F	5.194	5.1790	5.1630	.0160	-.010	F	5.261	5.2632	5.2739	-.0107	-.006
M	5.185	5.1811	5.1652	+.0159	+.002	M	5.272	5.2643	5.2764	-.0121	+.006
A	5.167	5.1831	5.1673	+.0158	+.008	A	5.252	5.2656	5.2787	-.0131	+.008
M	5.179	5.1850	5.1692	+.0158	-.010	M	5.270	5.2674	5.2809	-.0135	-.014
J	5.186	5.1870	5.1713	+.0157	-.004	J	5.280	5.2692	5.2830	-.0138	-.005
J	5.176	5.1896	5.1733	.0163	-.012	J	5.267	5.2713	5.2849	-.0136	-.012
A	5.198	5.1930	5.1752	+.0178	-.043	A	5.277	5.2736	5.2868	-.0132	-.044
S	5.183	5.1973	5.1770	+.0203	-.025	S	5.282	5.2761	5.2885	-.0124	-.023
S	5.210	5.2027	5.1788	+.0239	+.027	O	5.265	5.2786	5.2900	-.0114	+.028
N	5.216	5.2089	5.1807	+.0282	+.032	N	5.283	5.2815	5.2913	-.0098	+.022
D	5.206	5.2154	5.1824	+.0330	+.019	D	5.278	5.2848	5.2926	-.0078	+.019
1907						1912					
J	5.225	5.2216	5.1842	+.0374	+.027	J	5.290	5.2883	5.2936	-.0053	+.023
F	5.225	5.2266	5.1859	+.0407	-.010	F	5.301	5.2921	5.2943	-.0022	+.009
M	5.222	5.2298	5.1877	+.0421	+.003	M	5.291	5.2961	5.2951	+.0010	+.006
A	5.223	5.2312	5.1893	+.0419	+.008	A	5.311	5.3002	5.2957	+.0045	+.008
M	5.234	5.2280	5.1908	+.0372	-.011	M	5.311	5.3043	5.2961	+.0082	-.014
J	5.217	5.2231	5.1922	+.0309	-.004	J	5.289	5.3081	5.2965	+.0116	-.005
A	5.234	5.2158	5.1937	+.0221	-.012	J	5.308	5.3116	5.2968	+.0148	-.012
S	5.230	5.2066	5.1950	+.0116	-.043	S	5.318	5.3144	5.2969	-.0175	-.044
S	5.213	5.1956	5.1965	-.0009	-.024	S	5.305	5.3168	5.2969	+.0199	-.023
N	5.240	5.1859	5.1977	-.0118	+.027	O	5.333	5.3184	5.2969	+.0215	+.029
N	5.132	5.1755	5.1990	-.0235	-.021	N	5.325	5.3194	5.2969	+.0225	+.022
D	5.109	5.1671	5.2003	-.0332	+.019	D	5.313	5.3198	5.2970	+.0228	+.020
1908						1913					
J	5.155	5.1593	5.2015	-.0422	+.026	J	5.331	5.3198	5.2970	+.0228	+.022
F	5.143	5.1535	5.2027	-.0492	-.010	F	5.334	5.3192	5.2970	+.0222	+.010
M	5.145	5.1501	5.2039	-.0538	+.034	M	5.306	5.3189	5.2972	+.0217	+.005
A	5.156	5.1494	5.2051	-.0557	+.007	A	5.317	5.3186	5.2975	+.0211	+.007
M	5.153	5.1502	5.2062	-.0560	-.013	M	5.318	5.3186	5.2978	+.0208	-.014
J	5.157	5.1545	5.2076	-.0531	-.005	J	5.308	5.3189	5.2982	+.0207	-.004
J	5.177	5.1597	5.2088	-.0491	-.011	J	5.319	5.3196	5.2987	+.0209	-.011
A	5.165	5.1679	5.2099	-.0420	-.043	A	5.308	5.3204	5.2993	+.0211	-.043
S	5.192	5.1761	5.2111	-.0350	-.024	S	5.328	5.3215	5.3001	+.0214	-.022
S	5.181	5.1844	5.2124	-.0280	+.027	O	5.332	5.3221	5.3008	+.0213	+.029
N	5.191	5.1923	5.2138	-.0215	+.021	N	5.306	5.3225	5.3019	+.0206	+.023
D	5.207	5.2006	5.2152	-.0146	+.019	D	5.321	5.3222	5.3031	+.0191	+.020
1909						1914					
J	5.202	5.2065	5.2167	-.0102	+.026	J	5.327	5.3211	5.3045	+.0166	+.021
F	5.209	5.2126	5.2182	-.0056	-.009	F	5.319	5.3190	5.3060	+.0130	-.011
M	5.220	5.2184	5.2199	-.0015	+.005	M	5.316	5.3162	5.3077	+.0085	+.004
A	5.227	5.2240	5.2217	+.0023	+.008	A	5.324	5.3124	5.3096	+.0028	+.007
M	5.219	5.2098	5.2234	+.0064	-.013	M	5.301	5.3084	5.3116	+.0032	-.014
J	5.237	5.2356	5.2254	+.0102	-.005	J	5.317	5.3037	5.3138	-.0101	-.003
J	5.238	5.2414	5.2274	+.0140	-.012	J	5.325	5.2989	5.3163	-.0174	-.011
A	5.242	5.2470	5.2294	+.0176	-.044	A	5.284	5.2944	5.3189	-.0245	-.042
S	5.256	5.2522	5.2313	+.0209	-.023	S	5.282	5.2905	5.3216	-.0311	-.021
S	5.252	5.2568	5.2335	+.0233	+.028	O	5.271	5.2871	5.3246	-.0375	+.030
N	5.265	5.2607	5.2356	+.0251	+.022	N	5.260	5.2850	5.3279	-.0429	+.023
D	5.271	5.2638	5.2379	+.0259	+.019	D	5.279	5.2843	5.3312	-.0469	+.021

TABLE 29—Continued

BANK CLEARINGS OUTSIDE NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1915						1917					
J	5.286	5.2851	5.3349	-.0498	+.019	J	5.514	5.5117	5.4876	+.0241	+.017
F	5.305	5.2877	5.3386	-.0509	-.013	F	5.517	5.5212	5.4965	+.0247	-.017
M	5.308	5.2923	5.3428	-.0505	+.003	M	5.532	5.5298	5.5055	+.0243	+.001
A	5.315	5.2986	5.3471	-.0485	+.005	A	5.537	5.5372	5.5145	+.0227	+.002
M	5.305	5.3066	5.3516	-.0450	-.014	M	5.554	5.5433	5.5233	+.0200	-.014
J	5.314	5.3157	5.3561	-.0404	-.001	J	5.548	5.5482	5.5326	+.0156	+.002
J	5.319	5.3257	5.3613	-.0356	-.011	J	5.541	5.5523	5.5414	+.0109	-.011
A	5.335	5.3465	5.3665	-.0308	-.041	A	5.563	5.5561	5.5303	+.0058	-.036
S	5.353	5.3568	5.3718	-.0253	-.019	S	5.546	5.5601	5.5592	+.0009	-.016
O	5.353	5.3568	5.3774	-.0206	+.030	O	5.578	5.5648	5.5682	-.0034	+.030
N	5.383	5.3670	5.3833	-.0163	+.023	N	5.596	5.5705	5.5768	-.0063	+.021
D	5.393	5.3772	5.3893	-.0121	+.022	D	5.562	5.5774	5.5851	-.0077	+.024
1916						1918					
J	5.384	5.3874	5.3955	-.0081	+.018	J	5.567	5.5852	5.5934	-.0082	+.015
F	5.410	5.3978	5.4019	-.0041	-.015	F	5.572	5.5936	5.6014	-.0078	-.019
M	5.421	5.4083	5.4086	-.0003	+.002	M	5.597	5.6021	5.6092	-.0071	.000
A	5.407	5.4188	5.4157	+.0031	+.004	A	5.615	5.6104	5.6168	-.0064	+.001
M	5.435	5.4293	5.4229	+.0064	-.014	M	5.626	5.6179	5.6241	-.0062	-.013
J	5.432	5.4397	5.4307	+.0090	.000	J	5.616	5.6245	5.6311	-.0066	+.003
J	5.423	5.4499	5.4381	+.0118	-.011	J	5.641	5.6301	5.6379	-.0078	-.010
A	5.454	5.4600	5.4461	+.0139	-.039	A	5.665	5.6347	5.6441	-.0094	-.035
S	5.471	5.4703	5.4537	+.0166	-.018	S	5.642	5.6387	5.6499	-.0112	-.014
O	5.480	5.4806	5.4621	+.0185	+.030	O	5.661	5.6423	5.6558	-.0135	+.029
N	5.509	5.5010	5.4702	+.0208	+.022	N	5.644	5.6458	5.6611	-.0153	+.021
D	5.502	5.4915	5.4789	+.0226	+.023	D	5.635	5.6495	5.6659	-.0164	+.025
						1919					
						J	5.657	5.6538	5.6703	-.0165	+.01

BANK DEBITS FOR 140 OUTSIDE CITIES

Date	1	2	3	4	5	Date	1	2	3	4	5
1919						1921					
J	5.719	5.7158	5.7324	-.0166	+.015	J	5.751	5.7635	5.7685	-.0050	+.013
F	5.709	5.7208	5.7366	-.0158	-.020	F	5.737	5.7509	5.7680	-.0171	-.020
M	5.698	5.7269	5.7406	-.0137	.000	M	5.726	5.7392	5.7675	-.0283	+.001
A	5.709	5.7341	5.7443	-.0102	.000	A	5.724	5.7288	5.7668	-.0380	.000
M	5.744	5.7425	5.7477	-.0052	-.013	M	5.708	5.7201	5.7660	-.0459	-.013
J	5.764	5.7520	5.7508	+.0012	+.005	J	5.715	5.7134	5.7653	-.0519	+.008
J	5.789	5.7625	5.7537	+.0088	-.010	J	5.700	5.7089	5.7646	-.0557	-.010
A	5.790	5.7734	5.7562	-.0172	-.034	A	5.716	5.7064	5.7637	-.0571	-.034
S	5.793	5.7845	5.7584	+.0261	-.013	S	5.725	5.7059	5.7630	-.0571	-.011
O	5.787	5.7952	5.7605	+.0347	+.028	O	5.707	5.7068	5.7623	-.0555	+.025
N	5.791	5.8052	5.7623	+.0429	+.015	N	5.716	5.7089	5.7617	-.0528	+.010
D	5.818	5.8141	5.7640	+.0501	+.027	D	5.721	5.7115	5.7611	-.0496	+.029
1920						1922					
J	5.832	5.8215	5.7652	+.0563	+.014	J	5.697	5.7144	5.7606	-.0462	+.012
F	5.806	5.8272	5.7664	+.0608	-.020	F	5.720	5.7175	5.7601	-.0426	-.020
M	5.834	5.8312	5.7674	+.0638	.000	M	5.725	5.7208	5.7598	-.0390	+.002
A	5.831	5.8332	5.7682	+.0650	.000	A	5.717	5.7243	5.7595	-.0352	+.001
M	5.816	5.8330	5.7688	+.0642	-.013	M	5.733	5.7285	5.7593	-.0308	-.012
J	5.829	5.8308	5.7693	+.0615	+.007	J	5.749	5.7336	5.7593	-.0257	+.009
J	5.837	5.8263	5.7696	+.0567	-.010	J	5.732	5.7396	5.7594	-.0198	-.010
A	5.818	5.8195	5.7697	+.0498	-.033	A	5.744	5.7465	5.7596	-.0131	-.035
S	5.831	5.8109	5.7697	+.0412	-.012	S	5.753	5.7540	5.7600	-.0060	-.011
O	5.802	5.8005	5.7694	+.0311	+.027	O	5.750	5.7616	5.7604	+.0012	+.024
N	5.801	5.7888	5.7691	+.0197	+.012	N	5.749	5.7689	5.7611	+.0078	+.008
D	5.793	5.7763	5.7688	+.0075	+.028	D	5.771	5.7756	5.7619	+.0137	+.030

BANK CLEARINGS

A287

TABLE 29—Continued

BANK DEBITS FOR 140 OUTSIDE CITIES

Date	1	2	3	4	5	Date	1	2	3	4	5
1923						1928					
J	5.791	5.7813	5.7628	+.0185	+.011	J	5.898	5.9039	5.9225	-.0186	+.009
F	5.800	5.7859	5.7640	+.0219	-.019	F	5.890	5.9069	5.9247	-.0178	-.015
M	5.799	5.7892	5.7653	+.0239	+.003	M	5.915	5.9102	5.9267	-.0165	+.006
A	5.795	5.7915	5.7667	+.0248	+.002	A	5.920	5.9134	5.9286	-.0152	+.005
M	5.807	5.7928	5.7681	+.0247	-.011	M	5.936	5.9167	5.9303	-.0136	-.007
J	5.804	5.7931	5.7698	+.0233	+.010	J	5.946	5.9199	5.9319	-.0120	+.009
J	5.778	5.7928	5.7717	+.0211	-.010	J	5.896	5.9228	5.9332	-.0104	-.009
S	5.783	5.7918	5.7738	+.0180	-.036	A	5.918	5.9256	5.9339	-.0083	-.040
O	5.770	5.7904	5.7759	+.0145	-.010	S	5.921	5.9285	5.9345	-.0060	-.010
N	5.781	5.7885	5.7782	+.0103	+.023	O	5.931	5.9316	5.9346	-.0130	+.020
D	5.785	5.7867	5.7806	+.0061	+.006	N	5.933	5.9353	5.9345	+.0008	+.003
	5.788	5.7850	5.7831	+.0019	+.030	D	5.952	5.9396	5.9344	+.0052	+.029
1924						1929					
J	5.785	5.7838	5.7859	-.0021	+.011	J	5.949	5.9444	5.9342	+.0102	+.009
F	5.799	5.7833	5.7887	-.0054	-.018	F	5.956	5.9496	5.9333	+.0163	-.014
M	5.788	5.7838	5.7916	-.0078	+.004	M	5.952	5.9546	5.9320	+.0226	+.006
A	5.796	5.7850	5.7945	-.0095	+.003	A	5.946	5.9589	5.9304	+.0285	+.005
M	5.789	5.7871	5.7975	-.0104	-.010	M	5.939	5.9622	5.9282	+.0340	+.009
J	5.775	5.7898	5.8005	-.0107	+.010	J	5.936	5.9641			+.009
J	5.790	5.7932	5.8035	-.0103	-.010	J	5.972	5.9644			-.009
S	5.795	5.7970	5.8066	-.0096	-.037	A	6.000	5.9630			-.040
O	5.794	5.8012	5.8098	-.0086	-.010	S	5.969	5.9602			-.010
N	5.807	5.8058	5.8127	-.0069	+.022	O	5.998	5.9558			+.019
D	5.793	5.8106	5.8157	-.0051	+.005	N	5.975	5.9500			+.003
	5.818	5.8158	5.8187	-.0029	+.030	D	5.910	5.9430			+.029
1925						1930					
J	5.847	5.8211	5.8216	-.0005	+.010	J	5.911	5.9349			+.008
F	5.839	5.8266	5.8245	+.0021	-.017	F	5.900	5.9259			-.014
M	5.832	5.8320	5.8273	+.0047	+.004	M	5.900	5.9160			+.007
A	5.834	5.8360	5.8300	+.0062	+.003	A	5.904	5.9056			+.005
M	5.829	5.8410	5.8326	+.0084	-.010	M	5.902	5.8951			-.006
J	5.840	5.8454	5.8353	+.0101	+.010	J	5.906	5.8848			+.009
J	5.852	5.8493	5.8379	+.0114	-.009	J	5.883	5.8750			-.009
S	5.845	5.8526	5.8404	+.0122	-.038	A	5.870	5.8657			-.040
O	5.853	5.8565	5.8429	+.0136	-.010	S	5.860	5.8574			-.010
N	5.869	5.8589	5.8456	+.0133	+.021	O	5.864	5.8497			+.019
D	5.848	5.8609	5.8481	+.0128	+.004	N	5.815	5.8424			-.002
	5.860	5.8625	5.8507	+.0118	+.030	D	5.843	5.8352			+.029
1926						1931					
J	5.872	5.8636	5.8531	+.0105	+.010	J	5.837	5.8280			+.008
F	5.874	5.8643	5.8558	+.0085	-.016	F	5.799	5.8202			-.014
M	5.874	5.8646	5.8585	+.0061	+.005	M	5.790	5.8119			+.007
A	5.872	5.8645	5.8611	+.0034	+.004	A	5.811	5.8030			+.003
M	5.849	5.8643	5.8638	+.0005	-.009	M	5.790	5.7935			-.006
J	5.844	5.8640	5.8667	-.0027	+.010	J	5.802	5.7835			+.009
J	5.885	5.8639	5.8696	-.0057	-.009	J	5.783	5.7726			-.009
S	5.865	5.8641	5.8725	-.0084	-.039	A	5.767	5.7608			-.040
O	5.862	5.8649	5.8755	-.0106	-.010	S	5.754	5.7482			-.010
N	5.864	5.8661	5.8787	-.0126	+.021	O	5.748	5.7347			+.019
D	5.853	5.8679	5.8816	-.0137	+.004	N	5.667	5.7205			+.002
	5.869	5.8700	5.8847	-.0147	+.029	D	5.713	5.7058			+.029
1927						1932					
J	5.870	5.8725	5.8879	-.0154	+.009	J	5.702	5.6909			+.008
F	5.887	5.8751	5.8910	-.0159	-.016	F	5.661	5.6760			-.014
M	5.883	5.8777	5.8942	-.0165	+.006	M	5.639	5.6613			+.007
A	5.891	5.8803	5.8973	-.0170	+.004	A	5.675	5.6470			+.005
M	5.876	5.8835	5.9004	-.0175	-.008	M	5.611	5.6332			-.006
J	5.890	5.8855	5.9035	-.0180	+.010	J	5.625	5.6204			+.009
J	5.878	5.8881	5.9065	-.0184	-.009	J	5.615	5.6088			-.009
S	5.891	5.8906	5.9094	-.0188	-.039	A	5.619	5.5987			-.040
O	5.902	5.8932	5.9122	-.0190	-.010	S	5.604	5.5906			-.010
N	5.889	5.8957	5.9149	-.0192	+.020	O	5.581	5.5846			+.019
D	5.897	5.8983	5.9175	-.0192	+.003	N	5.560	5.5808			+.002
	5.903	5.9010	5.9200	-.0190	+.029	D	5.588	5.5789			+.029

TABLE 29—Concluded

BANK DEBITS FOR 140 OUTSIDE CITIES

Date	1	2	3	4	5	Date	1	2	3	4	5
1933						1935					
J	5.582	5.5788			+.008	J	5.679				+.008
F	5.584	5.5801			-.014	F	5.687				-.014
M	*	5.5826			+.007	M	5.702				+.007
A	5.544	5.5859			+.005	A	5.715				+.005
M	5.576	5.5902			-.006	M	5.709				-.006
J	5.627	5.5952			+.009	J	5.716				+.009
J	5.660	5.6010			-.009	J	5.739				-.009
A	5.641	5.6075			-.040	A	5.743				-.040
S	5.620	5.6144			-.010	S	5.713				-.010
O	5.604	5.6213			+.019	O	5.719				+.019
N	5.597	5.6279			+.002	N	5.746				+.002
D	5.603	5.6338			+.029	D	5.754				+.029
1934						1936					
J	5.621	5.6387			+.008	J	5.744				+.008
F	5.638	5.6426			-.014						
M	5.650	5.6458			+.007						
A	5.667	5.6486			+.005						
M	5.669				-.006						
J	5.683				+.009						
J	5.661				-.009						
A	5.676				-.040						
S	5.643				-.010						
O	5.650				+.019						
N	5.648				+.002						
D	5.676				+.029						

*Not available, complete data not having been reported on account of bank holidays.

TABLE 30

DEFLATED¹ BANK CLEARINGS OUTSIDE NEW YORK CITY, MONTHLY,
JANUARY 1875-JANUARY 1919, INCLUSIVE; DEFLATED¹ BANK
DEBITS FOR 140 OUTSIDE CITIES, MONTHLY,
JANUARY 1919-JANUARY 1936

- Col. 1. Logarithms of Data Adjusted for Seasonal Fluctuations.
- Col. 2. Cyclical Curve (logarithms).
- Col. 3. Trend Curve (logarithms).
- Col. 4. Deviations of Cyclical Curve (logarithms) from Trend Curve (logarithms).
- Col. 5. Changing Seasonal Fluctuations (logarithms).

For details of the nature of the graduations given in Columns 2 and 3 and of the seasonal given in Column 5 of this table, see Appendix D.

¹ Deflated by dividing the Clearings Figures of Table 27 by Carl Snyder's "Index of General Price Level."

TABLE 30

DEFLATED BANK CLEARINGS OUTSIDE NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1875						1880					
J	4.489	4.5110	4.5284	-.0174	+.031	J	4.649	4.6363	4.6146	+.0217	+.031
F	4.505	4.5115	4.5272	-.0157	-.007	F	4.645	4.6393	4.6199	+.0194	-.009
M	4.547	4.5127	4.5260	-.0133	+.005	M	4.658	4.6407	4.6252	+.0155	-.012
A	4.521	4.5145	4.5251	-.0106	-.010	A	4.658	4.6412	4.6304	+.0108	-.006
M	4.505	4.5167	4.5240	-.0073	-.003	M	4.626	4.6412	4.6353	+.0059	-.005
J	4.565	4.5189	4.5228	-.0039	-.005	J	4.621	4.6411	4.6407	+.0004	-.006
J	4.511	4.5215	4.5216	-.0001	-.026	J	4.639	4.6417	4.6459	-.0042	-.024
A	4.543	4.5235	4.5204	+.0031	-.041	A	4.637	4.6435	4.6508	-.0073	-.043
S	4.501	4.5249	4.5192	+.0057	-.031	S	4.634	4.6471	4.6557	-.0086	-.024
O	4.486	4.5255	4.5181	+.0074	+.033	O	4.620	4.6528	4.6605	-.0077	+.037
N	4.536	4.5252	4.5169	+.0083	+.046	N	4.673	4.6608	4.6653	-.0045	+.038
D	4.512	4.5243	4.5158	+.0085	+.009	D	4.699	4.6706	4.6701	+.0005	+.026
1876						1881					
J	4.522	4.5232	4.5146	+.0086	+.032	J	4.682	4.6819	4.6748	+.0071	+.029
F	4.519	4.5220	4.5135	+.0085	-.007	F	4.703	4.6938	4.6791	+.0147	-.011
M	4.555	4.5211	4.5126	+.0085	+.002	M	4.688	4.7054	4.6835	+.0219	-.014
A	4.492	4.5207	4.5118	+.0089	-.009	A	4.697	4.7156	4.6876	+.0280	-.005
M	4.513	4.5205	4.5109	+.0096	-.003	M	4.724	4.7239	4.6916	+.0323	-.005
J	4.545	4.5204	4.5103	+.0101	-.006	J	4.769	4.7297	4.6952	+.0345	-.004
J	4.505	4.5203	4.5097	+.0106	-.027	J	4.694	4.7329	4.6987	+.0342	-.022
A	4.550	4.5198	4.5091	+.0107	-.041	A	4.765	4.7339	4.7020	+.0319	-.043
S	4.512	4.5191	4.5088	+.0103	-.031	S	4.753	4.7330	4.7051	+.0279	-.022
O	4.494	4.5180	4.5086	+.0094	+.034	O	4.733	4.7308	4.7078	+.0230	+.037
N	4.524	4.5170	4.5084	+.0086	+.044	N	4.719	4.7278	4.7103	+.0175	+.036
D	4.526	4.5161	4.5083	+.0078	+.013	D	4.728	4.7245	4.7127	+.0118	+.027
1877						1882					
J	4.502	4.5155	4.5083	+.0072	+.033	J	4.704	4.7212	4.7149	+.0063	+.027
F	4.521	4.5156	4.5086	+.0070	-.007	F	4.707	4.7184	4.7167	+.0017	-.012
M	4.528	4.5159	4.5090	+.0069	-.002	M	4.706	4.7161	4.7183	-.0022	-.016
A	4.504	4.5167	4.5095	+.0072	-.009	A	4.710	4.7145	4.7197	-.0052	-.005
M	4.533	4.5177	4.5101	+.0076	-.004	M	4.706	4.7137	4.7209	-.0072	-.004
J	4.482	4.5183	4.5108	+.0075	-.006	J	4.714	4.7138	4.7218	-.0080	-.003
J	4.503	4.5185	4.5118	+.0067	-.028	J	4.727	4.7148	4.7225	-.0077	-.019
A	4.521	4.5184	4.5130	+.0054	-.041	A	4.728	4.7165	4.7230	-.0065	-.044
S	4.526	4.5177	4.5142	+.0035	-.030	S	4.744	4.7190	4.7235	-.0045	-.021
O	4.509	4.5166	4.5158	+.0008	+.035	O	4.711	4.7216	4.7238	-.0022	+.038
N	4.533	4.5155	4.5174	-.0019	+.042	N	4.731	4.7244	4.7240	+.0004	+.034
D	4.515	4.5142	4.5190	-.0048	+.018	D	4.711	4.7267	4.7239	+.0028	+.027
1878						1883					
J	4.561	4.5130	4.5210	-.0080	+.033	J	4.728	4.7287	4.7238	+.0049	+.025
F	4.498	4.5119	4.5231	-.0112	-.007	F	4.730	4.7302	4.7266	+.0066	-.014
M	4.470	4.5109	4.5253	-.0144	-.005	M	4.731	4.7312	4.7235	+.0077	-.017
A	4.489	4.5099	4.5280	-.0181	-.008	A	4.710	4.7319	4.7232	+.0087	-.004
M	4.520	4.5091	4.5306	-.0215	-.004	M	4.735	4.7328	4.7228	+.0100	-.004
J	4.480	4.5086	4.5335	-.0249	-.006	J	4.749	4.7337	4.7224	+.0113	-.001
J	4.550	4.5086	4.5366	-.0280	-.027	J	4.735	4.7348	4.7220	+.0128	-.017
A	4.491	4.5089	4.5398	-.0309	-.042	A	4.748	4.7360	4.7217	+.0143	-.045
S	4.533	4.5102	4.5431	-.0329	-.028	S	4.733	4.7371	4.7216	+.0155	-.020
O	4.553	4.5123	4.5465	-.0342	+.035	O	4.735	4.7376	4.7214	+.0162	+.038
N	4.487	4.5152	4.5501	-.0349	+.041	N	4.722	4.7375	4.7212	+.0163	+.033
D	4.493	4.5193	4.5540	-.0347	+.021	D	4.730	4.7364	4.7211	+.0153	+.027
1879						1884					
J	4.538	4.5244	4.5581	-.0337	+.033	J	4.734	4.7353	4.7212	+.0141	+.022
F	4.539	4.5306	4.5622	-.0316	-.008	F	4.729	4.7321	4.7214	+.0107	-.015
M	4.509	4.5383	4.5664	-.0281	-.009	M	4.724	4.7282	4.7216	+.0066	-.018
A	4.584	4.5474	4.5709	-.0235	-.007	A	4.749	4.7233	4.7218	+.0015	-.003
M	4.545	4.5577	4.5754	-.0177	-.004	M	4.751	4.7180	4.7222	-.0042	-.003
J	4.555	4.5693	4.5800	-.0107	-.006	J	4.691	4.7114	4.7226	-.0112	+.001
J	4.609	4.5815	4.5847	-.0032	-.026	J	4.699	4.7060	4.7232	-.0172	-.015
A	4.543	4.5938	4.5895	+.0043	-.042	A	4.691	4.7008	4.7240	-.0232	-.045
S	4.578	4.6054	4.5945	+.0109	-.027	S	4.694	4.6962	4.7250	-.0288	-.020
O	4.667	4.6159	4.5997	+.0162	+.036	O	4.684	4.6924	4.7259	-.0335	+.038
N	4.628	4.6246	4.6048	+.0198	+.039	N	4.665	4.6897	4.7270	-.0373	+.032
D	4.630	4.6314	4.6097	+.0217	+.024	D	4.708	4.6883	4.7283	-.0400	+.027

BANK CLEARINGS

A291

TABLE 30—Continued

DEFLATED BANK CLEARINGS OUTSIDE NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1885						1890					
J	4.710	4.6886	4.7297	-.0411	+.020	J	4.917	4.9102	4.9074	+.0028	+.017
F	4.682	4.6906	4.7312	-.0406	-.016	F	4.910	4.9178	4.9101	+.0077	-.017
M	4.686	4.6944	4.7330	-.0386	-.018	M	4.914	4.9250	4.9127	+.0123	-.018
A	4.709	4.6995	4.7348	-.0353	-.002	A	4.930	4.9313	4.9153	+.0160	+.001
M	4.687	4.7056	4.7368	-.0312	-.002	M	4.957	4.9364	4.9179	+.0185	+.004
J	4.720	4.7124	4.7389	-.0265	+.002	J	4.935	4.9399	4.9203	-.0196	+.003
J	4.739	4.7196	4.7411	-.0215	-.014	J	4.950	4.9417	4.9226	+.0191	.013
J	4.706	4.7266	4.7434	-.0168	-.045	A	4.946	4.9419	4.9250	+.0169	-.046
S	4.725	4.7335	4.7458	-.0123	-.020	S	4.953	4.9405	4.9272	+.0133	-.023
O	4.743	4.7401	4.7483	-.0082	+.038	O	4.951	4.9380	4.9292	+.0088	+.036
N	4.758	4.7461	4.7508	-.0047	+.031	N	4.940	4.9348	4.9314	+.0034	+.030
D	4.769	4.7518	4.7534	-.0016	+.026	D	4.915	4.9314	4.9332	-.0018	+.024
1886						1891					
J	4.748	4.7569	4.7563	+.0006	+.018	J	4.922	4.9282	4.9348	-.0066	+.018
F	4.767	4.7614	4.7592	+.0022	-.017	F	4.919	4.9257	4.9364	-.0107	-.016
M	4.784	4.7653	4.7622	+.0031	-.018	M	4.907	4.9242	4.9379	-.0137	-.018
A	4.754	4.7689	4.7652	+.0037	-.002	A	4.931	4.9240	4.9394	-.0154	+.002
M	4.745	4.7724	4.7683	+.0041	-.001	M	4.912	4.9249	4.9405	-.0156	+.004
J	4.781	4.7761	4.7713	+.0048	+.003	J	4.917	4.9271	4.9417	-.0146	+.003
J	4.797	4.7804	4.7746	+.0058	-.013	J	4.937	4.9310	4.9428	-.0118	-.013
A	4.786	4.7856	4.7779	+.0077	-.045	A	4.938	4.9348	4.9436	-.0088	-.046
S	4.796	4.7917	4.7811	+.0106	-.020	S	4.978	4.9389	4.9444	-.0055	-.025
O	4.784	4.7988	4.7843	+.0145	+.038	O	4.947	4.9429	4.9450	-.0021	+.035
N	4.810	4.8066	4.7877	+.0189	+.031	N	4.937	4.9466	4.9456	+.0010	+.031
D	4.822	4.8146	4.7913	+.0233	+.026	D	4.943	4.9489	4.9460	+.0029	+.025
1887						1892					
J	4.799	4.8224	4.7948	+.0276	+.017	J	4.940	4.9514	4.9464	+.0050	+.019
F	4.815	4.8295	4.7983	+.0312	-.017	F	4.975	4.9536	4.9466	+.0070	-.016
M	4.835	4.8355	4.8019	+.0336	-.018	M	4.961	4.9560	4.9469	+.0091	-.017
A	4.848	4.8399	4.8056	+.0343	-.001	A	4.952	4.9589	4.9468	+.0121	+.002
A	4.841	4.8429	4.8093	+.0336	-.000	M	4.942	4.9628	4.9469	+.0159	+.005
J	4.875	4.8444	4.8130	+.0314	+.004	J	4.976	4.9676	4.9468	+.0208	+.002
J	4.835	4.8443	4.8166	+.0277	-.012	J	4.963	4.9733	4.9466	+.0267	-.014
A	4.843	4.8430	4.8202	+.0228	-.045	A	4.982	4.9795	4.9465	+.0330	-.046
S	4.846	4.8409	4.8239	+.0170	-.020	S	4.984	4.9851	4.9462	+.0389	-.026
O	4.822	4.8380	4.8274	+.0106	+.038	O	4.971	4.9894	4.9460	+.0434	+.034
N	4.850	4.8351	4.8310	+.0041	+.030	N	4.985	4.9922	4.9457	+.0465	+.031
D	4.826	4.8325	4.8345	-.0020	+.025	D	4.993	4.9915	4.9450	+.0465	+.025
1888						1893					
J	4.819	4.8305	4.8381	-.0076	+.016	J	4.991	4.9878	4.9443	+.0435	+.020
F	4.831	4.8295	4.8416	-.0121	-.017	F	4.996	4.9811	4.9440	+.0371	-.015
M	4.818	4.8296	4.8448	-.0152	-.018	M	4.991	4.9719	4.9432	+.0287	-.016
A	4.827	4.8310	4.8481	-.0171	-.000	A	4.981	4.9599	4.9425	+.0174	+.003
M	4.844	4.8336	4.8512	-.0176	+.001	M	4.987	4.9475	4.9414	+.0061	+.004
J	4.836	4.8371	4.8544	-.0173	+.004	J	4.941	4.9344	4.9407	-.0063	+.002
J	4.838	4.8413	4.8574	-.0161	-.012	J	4.910	4.9217	4.9397	-.0180	-.015
A	4.855	4.8461	4.8603	-.0142	-.046	A	4.842	4.9098	4.9388	-.0290	-.046
S	4.844	4.8508	4.8631	-.0123	-.021	S	4.865	4.8995	4.9379	-.0384	-.027
O	4.878	4.8554	4.8659	-.0105	+.037	O	4.873	4.8913	4.9373	-.0460	+.033
N	4.851	4.8595	4.8688	-.0093	+.030	N	4.898	4.8860	4.9365	-.0505	+.031
D	4.856	4.8630	4.8715	-.0085	+.024	D	4.899	4.8835	4.9356	-.0521	+.026
1889						1894					
J	4.871	4.8660	4.8743	-.0083	+.017	J	4.909	4.8840	4.9346	-.0506	+.021
F	4.875	4.8682	4.8770	-.0088	-.017	F	4.884	4.8869	4.9338	-.0469	-.015
M	4.870	4.8700	4.8798	-.0098	-.018	M	4.901	4.8916	4.9331	-.0415	-.015
A	4.859	4.8716	4.8827	-.0111	+.001	A	4.896	4.8974	4.9322	-.0348	+.004
M	4.875	4.8731	4.8853	-.0122	+.003	M	4.911	4.9035	4.9316	-.0281	+.004
J	4.870	4.8748	4.8882	-.0134	+.003	J	4.903	4.9091	4.9309	-.0218	+.002
J	4.896	4.8771	4.8909	-.0138	-.012	J	4.899	4.9138	4.9305	-.0167	-.016
A	4.883	4.8802	4.8937	-.0135	-.046	A	4.934	4.9175	4.9300	-.0125	-.046
S	4.870	4.8843	4.8963	-.0120	-.022	S	4.921	4.9206	4.9295	-.0089	-.027
O	4.897	4.8895	4.8990	-.0095	+.037	O	4.931	4.9233	4.9292	-.0059	+.031
N	4.892	4.8957	4.9018	-.0061	+.030	N	4.930	4.9262	4.9287	-.0025	+.030
D	4.886	4.9027	4.9046	-.0019	+.024	D	4.929	4.9296	4.9284	+.0012	+.027

TABLE 30—Continued

DEFLATED BANK CLEARINGS OUTSIDE NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1895						1900					
J	4.941	4.9335	4.9282	+ .0053	+ .022	J	5.061	5.0703	5.0743	-.0040	+ .026
F	4.907	4.9379	4.9283	+ .0096	-.014	F	5.063	5.0668	5.0777	-.0109	-.011
M	4.928	4.9426	4.9283	+ .0143	-.014	M	5.064	5.0636	5.0808	-.0172	-.006
A	4.945	4.9474	4.9282	+ .0192	+ .004	A	5.059	5.0613	5.0838	-.0225	+ .008
M	4.938	4.9518	4.9282	+ .0236	+ .003	M	5.067	5.0600	5.0864	-.0264	-.002
J	4.949	4.9558	4.9284	+ .0274	+ .002	J	5.073	5.0600	5.0892	-.0292	.000
J	4.979	4.9592	4.9284	+ .0308	-.016	J	5.060	5.0616	5.0919	-.0303	-.015
A	4.962	4.9616	4.9290	+ .0326	-.047	A	5.067	5.0648	5.0945	-.0297	-.047
S	4.952	4.9631	4.9296	+ .0335	-.028	S	5.053	5.0696	5.0969	-.0273	-.028
O	4.987	4.9634	4.9302	+ .0332	+ .030	O	5.070	5.0757	5.0994	-.0237	+ .026
N	4.970	4.9626	4.9312	+ .0314	+ .030	N	5.082	5.0829	5.1016	-.0187	+ .025
D	4.968	4.9607	4.9324	+ .0283	+ .028	D	5.080	5.0905	5.1038	-.0133	+ .024
1896						1901					
J	4.948	4.9577	4.9336	+ .0241	+ .022	J	5.102	5.0983	5.1051	-.0074	+ .026
F	4.940	4.9538	4.9350	+ .0188	-.014	F	5.100	5.1057	5.1077	-.0020	-.011
M	4.931	4.9494	4.9366	+ .0128	-.013	M	5.106	5.1125	5.1095	+ .0030	-.005
A	4.946	4.9445	4.9384	+ .0061	+ .005	A	5.142	5.1183	5.1114	+ .0069	+ .008
M	4.932	4.9396	4.9401	-.0005	+ .002	M	5.150	5.1233	5.1130	-.0103	-.003
J	4.945	4.9350	4.9423	-.0073	+ .001	J	5.128	5.1271	5.1149	+ .0122	.000
J	4.955	4.9307	4.9444	-.0137	-.016	J	5.133	5.1298	5.1165	+ .0133	-.014
A	4.910	4.9272	4.9465	-.0193	-.047	A	5.135	5.1317	5.1180	+ .0137	-.047
S	4.921	4.9245	4.9489	-.0244	-.028	S	5.110	5.1328	5.1192	+ .0136	-.028
O	4.926	4.9229	4.9513	-.0284	+ .029	O	5.130	5.1335	5.1208	+ .0127	+ .026
N	4.927	4.9225	4.9538	-.0313	+ .029	N	5.129	5.1338	5.1221	+ .0117	+ .024
D	4.942	4.9234	4.9565	-.0331	+ .028	D	5.117	5.1342	5.1234	+ .0108	+ .023
1897						1902					
J	4.915	4.9257	4.9594	-.0337	+ .023	J	5.143	5.1348	5.1246	+ .0102	+ .027
F	4.929	4.9296	4.9620	-.0324	-.013	F	5.131	5.1357	5.1258	+ .0099	-.010
M	4.934	4.9350	4.9651	-.0301	-.011	M	5.129	5.1367	5.1270	+ .0097	-.003
A	4.934	4.9416	4.9680	-.0264	+ .006	A	5.157	5.1381	5.1285	+ .0096	+ .008
M	4.924	4.9493	4.9708	-.0215	+ .001	M	5.152	5.1394	5.1298	+ .0096	-.005
J	4.949	4.9578	4.9736	-.0158	+ .001	J	5.119	5.1407	5.1312	+ .0095	-.001
J	4.968	4.9665	4.9764	-.0099	-.016	J	5.160	5.1417	5.1324	+ .0093	-.014
A	4.984	4.9750	4.9794	-.0044	-.048	A	5.134	5.1426	5.1337	+ .0089	-.046
S	5.019	4.9827	4.9825	+ .0002	-.029	S	5.159	5.1431	5.1349	+ .0082	-.027
O	4.983	4.9892	4.9853	+ .0039	+ .027	O	5.148	5.1437	5.1364	+ .0073	+ .026
N	4.998	4.9941	4.9883	+ .0058	+ .028	N	5.129	5.1443	5.1378	+ .0065	+ .023
D	4.998	4.9972	4.9914	+ .0058	+ .028	D	5.136	5.1450	5.1392	+ .0058	+ .022
1898						1903					
J	4.992	4.9989	4.9944	+ .0045	+ .024	J	5.150	5.1459	5.1404	+ .0055	+ .027
F	5.015	4.9994	4.9973	+ .0021	-.012	F	5.143	5.1470	5.1418	+ .0052	-.010
M	5.008	4.9992	5.0003	-.0011	-.010	M	5.136	5.1482	5.1433	+ .0049	-.002
A	4.988	4.9991	5.0034	-.0043	+ .006	A	5.152	5.1493	5.1448	+ .0045	+ .008
M	4.991	4.9998	5.0065	-.0067	.000	M	5.140	5.1500	5.1465	+ .0035	-.006
J	5.013	5.0013	5.0094	+ .0081	+ .001	J	5.167	5.1504	5.1481	+ .0023	-.002
J	5.076	5.0047	5.0127	-.0080	-.016	J	5.170	5.1502	5.1498	+ .0004	-.013
A	5.017	5.0099	5.0160	-.0061	-.048	A	5.144	5.1492	5.1517	-.0025	-.046
S	5.013	5.0162	5.0194	-.0032	-.029	S	5.156	5.1477	5.1536	-.0059	-.027
O	5.003	5.0245	5.0228	+ .0017	+ .027	O	5.155	5.1456	5.1555	-.0099	+ .026
N	5.029	5.0338	5.0262	+ .0076	+ .027	N	5.129	5.1433	5.1574	-.0141	+ .022
D	5.050	5.0436	5.0297	+ .0139	+ .027	D	5.145	5.1409	5.1594	-.0185	+ .021
1899						1904					
J	5.060	5.0534	5.0330	+ .0204	+ .025	J	5.133	5.1389	5.1614	-.0225	+ .027
F	5.079	5.0630	5.0367	+ .0263	-.012	F	5.140	5.1376	5.1634	-.0258	-.010
M	5.096	5.0711	5.0402	+ .0309	-.008	M	5.141	5.1374	5.1654	-.0280	-.001
A	5.071	5.0776	5.0437	+ .0339	+ .007	A	5.139	5.1384	5.1674	-.0290	+ .008
M	5.080	5.0824	5.0470	+ .0354	-.001	M	5.123	5.1405	5.1696	-.0291	-.008
J	5.079	5.0853	5.0505	+ .0348	+ .001	J	5.145	5.1440	5.1715	-.0275	-.002
J	5.072	5.0864	5.0542	+ .0322	-.016	J	5.139	5.1485	5.1737	-.0252	-.013
A	5.084	5.0860	5.0577	+ .0283	-.048	A	5.157	5.1536	5.1757	-.0221	-.045
S	5.096	5.0841	5.0611	+ .0231	-.029	S	5.169	5.1592	5.1776	-.0184	-.026
O	5.082	5.0812	5.0644	+ .0168	+ .026	O	5.161	5.1649	5.1795	-.0146	+ .026
N	5.078	5.0779	5.0677	+ .0102	+ .026	N	5.193	5.1705	5.1815	-.0110	+ .022
D	5.073	5.0742	5.0611	+ .0031	+ .026	D	5.190	5.1758	5.1835	-.0077	+ .020

BANK CLEARINGS

A293

TABLE 30—Continued

DEFLATED BANK CLEARINGS OUTSIDE NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1905						1910					
J	5.162	5.1806	5.1854	-.0048	+.027	J	5.277	5.2842	5.2618	+.0224	+.025
F	5.177	5.1852	5.1871	-.0019	-.010	F	5.280	5.2845	5.2636	+.0209	+.009
M	5.195	5.1894	5.1890	+.0004	+.001	M	5.298	5.2842	5.2654	+.0188	+.006
A	5.189	5.1934	5.1908	+.0026	+.008	A	5.288	5.2835	5.2675	+.0160	+.008
M	5.204	5.1973	5.1926	+.0047	-.009	M	5.269	5.2825	5.2693	+.0132	-.014
J	5.202	5.2011	5.1943	+.0068	-.003	J	5.283	5.2804	5.2714	+.0090	-.005
J	5.187	5.2046	5.1960	+.0086	-.012	J	5.277	5.2792	5.2733	+.0059	-.012
A	5.207	5.2081	5.1976	+.0105	-.044	A	5.274	5.2781	5.2752	+.0029	-.044
S	5.210	5.2112	5.1995	+.0117	-.026	S	5.275	5.2774	5.2771	+.0003	-.003
O	5.201	5.2141	5.2011	+.0130	+.026	O	5.270	5.2770	5.2791	-.0021	+.028
N	5.220	5.2166	5.2027	+.0139	+.022	N	5.282	5.2770	5.2810	-.0040	+.022
D	5.224	5.2187	5.2043	+.0144	+.019	D	5.284	5.2773	5.2830	-.0057	+.019
1906						1911					
J	5.242	5.2206	5.2058	+.0148	+.027	J	5.280	5.2780	5.2850	-.0070	+.024
F	5.234	5.2220	5.2074	+.0146	-.010	F	5.274	5.2789	5.2867	-.0078	-.009
M	5.226	5.2231	5.2090	+.0141	+.002	M	5.285	5.2801	5.2885	-.0084	+.006
A	5.207	5.2242	5.2104	+.0138	+.008	A	5.270	5.2812	5.2901	-.0089	+.008
M	5.220	5.2251	5.2117	+.0134	-.010	M	5.288	5.2827	5.2920	-.0093	-.014
J	5.227	5.2260	5.2132	+.0128	-.004	J	5.293	5.2839	5.2936	-.0097	-.005
J	5.217	5.2274	5.2146	+.0128	-.012	J	5.281	5.2851	5.2950	-.0099	-.012
A	5.235	5.2295	5.2159	+.0136	-.043	A	5.291	5.2864	5.2963	-.0079	-.044
S	5.220	5.2323	5.2170	+.0153	-.025	S	5.295	5.2877	5.2975	-.0098	-.023
O	5.247	5.2361	5.2183	+.0178	+.027	O	5.274	5.2888	5.2983	-.0095	+.028
N	5.249	5.2407	5.2196	+.0211	+.022	N	5.292	5.2903	5.2994	-.0091	+.022
D	5.233	5.2457	5.2207	+.0250	+.019	D	5.287	5.2921	5.3004	-.0083	+.019
1907						1912					
J	5.252	5.2504	5.2219	+.0285	+.027	J	5.294	5.2940	5.3011	-.0071	+.023
F	5.251	5.2542	5.2230	+.0312	-.010	F	5.305	5.2964	5.3015	-.0051	-.009
M	5.249	5.2566	5.2243	+.0323	+.003	M	5.295	5.2991	5.3021	-.0030	+.006
A	5.250	5.2575	5.2254	+.0321	+.008	A	5.311	5.3018	5.3025	-.0007	+.008
M	5.261	5.2543	5.2263	+.0280	-.011	M	5.311	5.3049	5.3028	+.0021	-.014
J	5.243	5.2498	5.2274	+.0224	-.004	J	5.289	5.3079	5.3031	+.0048	-.005
J	5.261	5.2433	5.2284	+.0149	-.012	J	5.308	5.3108	5.3033	+.0075	-.012
A	5.257	5.2352	5.2292	+.0060	-.043	A	5.318	5.3132	5.3034	+.0098	-.044
S	5.240	5.2256	5.2301	-.0045	-.024	S	5.305	5.3155	5.3034	+.0121	-.023
O	5.271	5.2174	5.2309	-.0135	+.027	O	5.329	5.3171	5.3034	+.0137	+.029
N	5.168	5.2085	5.2318	-.0233	+.021	N	5.320	5.3182	5.3034	+.0148	+.022
D	5.145	5.2016	5.2326	-.0310	+.019	D	5.313	5.3189	5.3035	+.0154	+.020
1908						1913					
J	5.192	5.1951	5.2334	-.0383	+.026	J	5.331	5.3191	5.3035	+.0156	+.022
F	5.179	5.1904	5.2343	-.0439	-.010	F	5.334	5.3187	5.3035	+.0152	-.010
M	5.186	5.1879	5.2351	-.0472	+.004	M	5.306	5.3185	5.3037	+.0148	+.005
A	5.192	5.1877	5.2358	-.0481	+.007	A	5.317	5.3184	5.3040	+.0144	+.007
M	5.189	5.1888	5.2367	-.0479	-.013	M	5.318	5.3184	5.3042	+.0142	-.014
J	5.198	5.1930	5.2376	-.0446	-.003	J	5.312	5.3188	5.3045	+.0143	-.004
J	5.218	5.1979	5.2384	-.0405	-.011	J	5.319	5.3195	5.3048	+.0147	-.011
A	5.201	5.2056	5.2391	-.0335	-.043	A	5.308	5.3202	5.3052	+.0150	-.043
S	5.229	5.2131	5.2401	-.0270	-.024	S	5.324	5.3213	5.3057	+.0156	-.022
O	5.217	5.2206	5.2411	-.0205	+.027	O	5.328	5.3217	5.3061	+.0156	+.029
N	5.227	5.2276	5.2420	-.0144	+.021	N	5.306	5.3219	5.3067	+.0152	+.023
D	5.239	5.2349	5.2431	-.0082	+.019	D	5.321	5.3215	5.3074	+.0141	+.020
1909						1914					
J	5.234	5.2398	5.2442	-.0044	+.026	J	5.327	5.3202	5.3081	+.0121	+.021
F	5.240	5.2448	5.2453	-.0005	-.009	F	5.319	5.3180	5.3089	+.0091	-.011
M	5.252	5.2495	5.2467	+.0028	+.005	M	5.316	5.3151	5.3098	+.0053	+.004
A	5.258	5.2539	5.2480	+.0059	+.008	A	5.324	5.3113	5.3108	+.0005	+.007
M	5.246	5.2584	5.2492	+.0092	-.013	M	5.301	5.3074	5.3116	-.0042	-.014
J	5.264	5.2629	5.2507	-.0122	-.005	J	5.317	5.3029	5.3128	-.0099	-.003
J	5.265	5.2673	5.2523	+.0150	-.012	J	5.325	5.2984	5.3140	-.0156	-.011
A	5.269	5.2714	5.2538	+.0176	-.044	A	5.280	5.2942	5.3151	-.0209	-.042
S	5.279	5.2751	5.2552	+.0199	-.023	S	5.277	5.2906	5.3162	-.0256	-.021
O	5.274	5.2782	5.2568	+.0214	+.028	O	5.271	5.2875	5.3176	-.0301	+.030
N	5.282	5.2806	5.2585	+.0221	+.022	N	5.264	5.2857	5.3191	-.0334	+.023
D	5.289	5.2822	5.2599	+.0223	+.019	D	5.279	5.2851	5.3205	-.0354	+.021

TABLE 30—Continued

DEFLATED BANK CLEARINGS OUTSIDE NEW YORK CITY

Date	1	2	3	4	5	Date	1	2	3	4	5
1915						1917					
J	5.286	5.2857	5.3221	-.0364	+ .019	J	5.407	5.4011	5.3861	+ .0150	+ .017
F	5.305	5.2878	5.3237	-.0359	- .013	F	5.403	5.4030	5.3896	+ .0134	- .017
M	5.308	5.2915	5.3254	-.0339	+ .003	M	5.411	5.4045	5.3933	+ .0112	+ .001
A	5.311	5.2962	5.3272	-.0310	+ .005	A	5.403	5.4055	5.3969	+ .0086	+ .002
M	5.300	5.3019	5.3293	-.0274	- .014	M	5.411	5.4060	5.4002	+ .0058	- .014
J	5.309	5.3081	5.3312	-.0231	- .001	J	5.397	5.4063	5.4039	+ .0024	+ .002
M	5.310	5.3146	5.3336	-.0190	- .011	J	5.391	5.4067	5.4072	- .0005	- .011
A	5.300	5.3209	5.3359	- .0150	- .041	A	5.411	5.4075	5.4105	- .0030	- .036
S	5.318	5.3271	5.3379	- .0108	- .019	S	5.393	5.4089	5.4138	- .0049	- .016
O	5.324	5.3327	5.3403	-.0076	+ .030	O	5.425	5.4113	5.4172	- .0059	+ .030
N	5.353	5.3382	5.3428	- .0046	+ .023	N	5.447	5.4146	5.4203	- .0057	+ .021
D	5.360	5.3436	5.3453	- .0017	+ .022	D	5.406	5.4187	5.4231	- .0044	+ .024
1916						1918					
J	5.343	5.3491	5.3479	+ .0012	+ .018	J	5.409	5.4232	5.4261	- .0029	+ .015
F	5.365	5.3547	5.3506	+ .0041	- .015	F	5.408	5.4279	5.4289	- .0010	- .019
M	5.368	5.3606	5.3534	+ .0072	+ .002	M	5.430	5.4321	5.4315	+ .0006	- .000
A	5.352	5.3664	5.3564	+ .0100	+ .004	A	5.442	5.4356	5.4340	+ .0016	+ .001
M	5.378	5.3720	5.3595	+ .0125	- .014	M	5.447	5.4381	5.4364	+ .0017	- .013
J	5.372	5.3773	5.3630	+ .0143	- .000	J	5.431	5.4396	5.4387	+ .0009	+ .003
J	5.362	5.3820	5.3659	+ .0161	- .011	J	5.451	5.4402	5.4410	- .0008	- .010
A	5.387	5.3862	5.3693	+ .0169	- .039	A	5.466	5.4401	5.4428	- .0027	- .035
S	5.392	5.3899	5.3722	+ .0177	- .018	S	5.438	5.4397	5.4444	- .0047	- .014
O	5.394	5.3932	5.3758	+ .0174	+ .030	O	5.451	5.4394	5.4461	- .0067	+ .029
N	5.408	5.3960	5.3791	+ .0169	+ .022	N	5.434	5.4395	5.4477	- .0082	+ .018
D	5.398	5.3987	5.3825	+ .0162	+ .023	D	5.420	5.4401	5.4490	- .0089	+ .025
						1919					
						J	5.446	5.4415	5.4500	- .0085	+ .015

DEFLATED BANK DEBITS FOR 140 OUTSIDE CITIES

Date	1	2	3	4	5	Date	1	2	3	4	5
1919						1921					
J	5.508	5.5035	5.5121	-.0086	+ .015	J	5.503	5.5123	5.5269	- .0146	+ .013
F	5.503	5.5058	5.5132	- .0074	- .020	F	5.502	5.5090	5.5273	- .0183	- .020
M	5.489	5.5091	5.5143	-.0052	- .000	M	5.497	5.5063	5.5279	- .0216	+ .001
A	5.495	5.5132	5.5153	-.0021	- .000	A	5.501	5.5042	5.5283	- .0241	- .000
M	5.522	5.5180	5.5161	+ .0019	- .013	M	5.493	5.5029	5.5288	- .0259	- .013
J	5.534	5.5233	5.5169	+ .0064	+ .005	J	5.505	5.5025	5.5294	- .0269	+ .008
J	5.548	5.5288	5.5177	+ .0111	- .010	J	5.496	5.5032	5.5300	- .0268	- .010
A	5.544	5.5340	5.5184	+ .0156	- .014	A	5.512	5.5048	5.5305	- .0257	- .034
S	5.548	5.5386	5.5190	- .0196	- .013	S	5.523	5.5074	5.5311	- .0237	- .011
O	5.537	5.5423	5.5198	+ .0225	+ .028	O	5.505	5.5105	5.5318	- .0213	+ .025
N	5.533	5.5448	5.5204	+ .0244	+ .015	N	5.514	5.5140	5.5325	- .0188	+ .010
D	5.553	5.5462	5.5210	+ .0252	+ .027	D	5.523	5.5174	5.5333	- .0159	+ .029
1920						1922					
J	5.558	5.5464	5.5212	+ .0252	+ .014	J	5.504	5.5206	5.5343	- .0137	+ .012
F	5.531	5.5457	5.5218	- .0239	- .020	F	5.531	5.5236	5.5350	- .0114	- .020
M	5.551	5.5443	5.5223	+ .0220	- .000	M	5.535	5.5263	5.5361	- .0098	+ .002
A	5.539	5.5423	5.5228	- .0195	- .000	A	5.524	5.5289	5.5371	- .0082	- .012
M	5.520	5.5399	5.5232	+ .0167	- .013	M	5.536	5.5318	5.5382	- .0064	- .012
J	5.531	5.5371	5.5238	+ .0133	+ .007	J	5.550	5.5353	5.5393	- .0340	+ .004
J	5.540	5.5340	5.5242	+ .0098	- .010	J	5.532	5.5394	5.5406	- .0312	- .010
A	5.528	5.5305	5.5246	+ .0059	- .033	A	5.540	5.5442	5.5418	+ .0024	- .035
S	5.541	5.5270	5.5251	+ .0019	- .012	S	5.549	5.5494	5.5433	+ .0061	- .011
O	5.518	5.5231	5.5254	- .0023	+ .027	O	5.543	5.5547	5.5447	+ .0100	+ .024
N	5.530	5.5194	5.5259	- .0063	+ .012	N	5.539	5.5508	5.5463	+ .0135	+ .008
D	5.539	5.5157	5.5263	- .0106	+ .028	D	5.558	5.5644	5.5477	+ .0167	+ .030

BANK CLEARINGS

A295

TABLE 30—Continued

DEPLETED BANK DEBITS FOR 140 OUTSIDE CITIES

Date	1	2	3	4	5	Date	1	2	3	4	5
1923						1928					
J	5.579	5.5683	5.5493	+ .0190	+ .011	J	5.660	5.6640	5.6756	- .0116	+ .009
F	5.585	5.5713	5.5510	+ .0203	- .019	F	5.652	5.6657	5.6772	- .0115	- .015
M	5.581	5.5733	5.5528	+ .0205	+ .003	M	5.674	5.6678	5.6787	- .0109	+ .006
A	5.579	5.5743	5.5546	+ .0197	+ .002	A	5.677	5.6700	5.6802	- .0102	+ .005
M	5.587	5.5747	5.5563	+ .0184	- .011	M	5.688	5.6723	5.6817	- .0094	- .007
J	5.584	5.5743	5.5583	+ .0160	+ .010	J	5.700	5.6747	5.6830	- .0083	+ .009
J	5.561	5.5734	5.5603	+ .0131	- .010	J	5.650	5.6767	5.6841	- .0074	- .009
A	5.565	5.5720	5.5623	+ .0097	- .036	A	5.672	5.6786	5.6849	- .0063	- .040
S	5.552	5.5704	5.5641	+ .0063	- .010	S	5.671	5.6805	5.6856	- .0051	- .010
O	5.561	5.5684	5.5662	+ .0022	+ .023	O	5.683	5.6825	5.6858	- .0033	+ .020
N	5.564	5.5668	5.5683	- .0015	+ .006	N	5.682	5.6851	5.6859	- .0008	+ .003
D	5.567	5.5654	5.5703	- .0049	+ .030	D	5.701	5.6881	5.6863	+ .0018	+ .029
1924						1929					
J	5.562	5.5645	5.5726	- .0081	+ .011	J	5.696	5.6917	5.6867	+ .0050	+ .009
F	5.576	5.5644	5.5746	- .0102	- .016	F	5.703	5.6958	5.6865	+ .0093	- .014
M	5.568	5.5653	5.5769	- .0116	+ .004	M	5.697	5.6999	5.6860	- .0139	+ .006
A	5.578	5.5667	5.5792	- .0125	+ .003	A	5.693	5.7035	5.6853	+ .0182	+ .005
M	5.572	5.5689	5.5815	- .0126	- .010	M	5.686	5.7065	5.6842	+ .0223	- .007
J	5.561	5.5716	5.5837	- .0121	+ .010	J	5.683	5.7085			+ .009
J	5.572	5.5748	5.5858	- .0110	- .010	J	5.715	5.7085			- .009
A	5.575	5.5783	5.5880	- .0097	+ .010	A	5.742	5.7086			- .040
S	5.576	5.5820	5.5903	- .0083	- .010	S	5.708	5.7069			- .010
O	5.590	5.5859	5.5923	- .0064	+ .022	O	5.741	5.7041			+ .019
N	5.574	5.5898	5.5944	- .0046	+ .005	N	5.734	5.7002			+ .003
D	5.592	5.5939	5.5965	- .0026	+ .030	D	5.669	5.6955			+ .029
1925						1930					
J	5.619	5.5979	5.5985	- .0006	+ .010	J	5.670	5.6900			+ .008
F	5.611	5.6019	5.6005	+ .0014	- .017	F	5.663	5.6839			- .014
M	5.605	5.6057	5.6025	+ .0032	+ .004	M	5.662	5.6773			+ .007
A	5.609	5.6083	5.6045	+ .0038	+ .003	A	5.664	5.6703			+ .005
M	5.603	5.6116	5.6064	+ .0052	- .010	M	5.667	5.6634			- .006
J	5.620	5.6146	5.6084	+ .0062	+ .010	J	5.678	5.6568			+ .009
J	5.621	5.6172	5.6103	+ .0069	- .009	J	5.660	5.6508			- .009
A	5.612	5.6195	5.6122	+ .0073	- .038	A	5.650	5.6453			- .040
S	5.621	5.6226	5.6141	+ .0085	- .010	S	5.638	5.6408			- .010
O	5.633	5.6244	5.6162	+ .0082	+ .021	O	5.652	5.6371			+ .019
N	5.610	5.6259	5.6181	+ .0078	+ .004	N	5.609	5.6337			+ .002
D	5.622	5.6271	5.6202	+ .0069	+ .030	D	5.645	5.6306			+ .029
1926						1931					
J	5.634	5.6280	5.6221	+ .0059	+ .010	J	5.641	5.6275			+ .008
F	5.637	5.6286	5.6243	+ .0043	- .016	F	5.604	5.6238			- .014
M	5.642	5.6289	5.6265	+ .0024	+ .005	M	5.594	5.6196			+ .007
A	5.639	5.6290	5.6285	+ .0005	+ .004	A	5.620	5.6149			+ .005
M	5.616	5.6291	5.6306	- .0015	- .009	M	5.605	5.6077			- .006
J	5.611	5.6295	5.6329	- .0036	+ .010	J	5.626	5.6042			+ .009
A	5.653	5.6298	5.6352	- .0054	- .009	A	5.610	5.5981			- .009
S	5.632	5.6307	5.6374	- .0067	- .039	S	5.594	5.5914			- .040
O	5.626	5.6321	5.6398	- .0077	- .010	O	5.587	5.5841			- .010
N	5.632	5.6339	5.6423	- .0084	+ .021	N	5.590	5.5762			+ .019
D	5.618	5.6362	5.6444	- .0083	+ .004	D	5.527	5.5675			+ .002
	5.636	5.6387	5.6469	- .0082	+ .029		5.567	5.5583			+ .029
1927						1932					
J	5.639	5.6414	5.6494	- .0080	+ .009	J	5.562	5.5485			+ .008
F	5.656	5.6442	5.6517	- .0075	- .016	F	5.527	5.5385			- .014
M	5.653	5.6468	5.6542	- .0074	- .006	M	5.502	5.5283			+ .007
A	5.663	5.6492	5.6566	- .0074	+ .004	A	5.548	5.5182			+ .005
M	5.646	5.6515	5.6589	- .0074	- .008	M	5.490	5.5084			- .006
J	5.657	5.6536	5.6613	- .0077	+ .010	J	5.514	5.4994			+ .009
J	5.648	5.6555	5.6637	- .0082	- .009	J	5.504	5.4915			- .009
A	5.658	5.6571	5.6658	- .0087	- .039	A	5.498	5.4849			- .040
S	5.664	5.6586	5.6678	- .0092	- .010	S	5.483	5.4799			- .010
O	5.650	5.6599	5.6698	- .0099	+ .020	O	5.464	5.4766			+ .019
N	5.658	5.6611	5.6718	- .0107	+ .003	N	5.446	5.4750			+ .002
D	5.662	5.6625	5.6737	- .0112	+ .029	D	5.481	5.4747			+ .029

TABLE 30—Concluded

DEFLATED BANK DEBITS FOR 140 OUTSIDE CITIES

Date	1	2	3	4	5	Date	1	2	3	4	5
1933						1935					
J	5.478	5.4755			+.008	J	5.530				+.008
F	5.491	5.4771			-.014	F	5.535				-.014
M	*	5.4793			+.007	M	5.553				+.007
A	5.451	5.4816			+.005	A	5.563				+.005
M	5.472	5.4844			-.006	M	5.554				-.006
J	5.520	5.4872			+.009	J	5.558				+.009
J	5.539	5.4904			-.009	J	5.578				-.009
A	5.520	5.4937			-.040	A	5.579				-.040
S	5.496	5.4972			-.010	S	5.546				-.010
O	5.480	5.5006			+.019	O	5.549				+.019
N	5.473	5.5039			+.002	N	5.573				+.002
D	5.482	5.5067			+.029	D	5.591				+.029
1934						1936					
J	5.497	5.5089			+.008	J	5.568				+.008
F	5.504	5.5106			-.014						
M	5.516	5.5120			+.007						
A	5.530	5.5133			+.005						
M	5.535				-.006						
J	5.546				+.009						
J	5.521				-.009						
A	5.536				-.040						
S	5.500				-.010						
O	5.507				+.019						
N	5.502				+.002						
D	5.530				+.029						

*Not available, complete data not having been reported on account of bank holidays.

TABLE 31

DAILY AVERAGE PIG IRON PRODUCTION¹ IN THE UNITED STATES, MONTHLY,
JANUARY 1877-JANUARY 1936

- Col. 1. Logarithms of Data (see Table 27—Column 4).
- Col. 2. Cyclical Curve (logarithms).
- Col. 3. Trend Curve (logarithms).
- Col. 4. Deviations of Cyclical Curve (logarithms) from Trend Curve (logarithms).

For details of the nature of the graduations given in Columns 2 and 3 of this table, see Appendix D.

¹ These figures do not include charcoal pig iron.

TABLE 31

PIG IRON PRODUCTION¹ IN THE UNITED STATES

Date	1	2	3	4	Date	1	2	3	4
1877					1882				
J	.673	.6661	.6627	+ .0034	J	1.041	1.0161	1.0197	- .0036
F	.679	.6683	.6652	+ .0031	F	1.055	1.0199	1.0216	- .0017
M	.684	.6706	.6681	+ .0025	M	1.051	1.0239	1.0233	+ .0006
A	.686	.6733	.6715	+ .0018	A	1.043	1.0281	1.0247	+ .0034
M	.681	.6771	.6752	+ .0019	M	1.033	1.0323	1.0258	+ .0065
J	.674	.6821	.6789	+ .0032	J	1.024	1.0363	1.0266	+ .0097
J	.672	.6886	.6831	+ .0055	J	1.013	1.0400	1.0271	+ .0129
A	.676	.6965	.6877	+ .0088	A	1.010	1.0434	1.0274	+ .0160
S	.685	.7053	.6926	+ .0127	S	1.020	1.0467	1.0273	+ .0194
O	.699	.7147	.6977	+ .0170	O	1.047	1.0501	1.0271	+ .0230
N	.716	.7241	.7029	+ .0212	N	1.063	1.0535	1.0267	+ .0268
D	.735	.7331	.7084	+ .0247	D	1.073	1.0569	1.0262	+ .0307
1878					1883				
J	.756	.7410	.7140	+ .0270	J	1.079	1.0600	1.0256	+ .0344
F	.771	.7476	.7200	+ .0276	F	1.080	1.0623	1.0248	+ .0375
M	.777	.7522	.7261	+ .0261	M	1.075	1.0632	1.0241	+ .0391
A	.771	.7548	.7324	+ .0224	A	1.060	1.0623	1.0235	+ .0388
M	.760	.7550	.7389	+ .0161	M	1.048	1.0593	1.0229	+ .0364
J	.751	.7530	.7455	+ .0075	J	1.045	1.0542	1.0223	+ .0319
J	.736	.7490	.7524	- .0034	J	1.043	1.0476	1.0219	+ .0257
A	.726	.7435	.7595	- .0160	A	1.041	1.0401	1.0216	+ .0185
S	.720	.7374	.7666	- .0292	S	1.038	1.0325	1.0211	+ .0114
O	.726	.7317	.7740	- .0423	O	1.032	1.0256	1.0210	+ .0046
N	.732	.7273	.7816	- .0543	N	1.026	1.0199	1.0210	- .0011
D	.738	.7254	.7890	- .0636	D	1.016	1.0156	1.0213	- .0057
1879					1884				
J	.741	.7269	.7963	- .0694	J	.997	1.0126	1.0218	- .0092
F	.744	.7323	.8040	- .0717	F	.985	1.0105	1.0224	- .0119
M	.747	.7421	.8119	- .0698	M	.992	1.0092	1.0232	- .0140
A	.751	.7562	.8197	- .0635	A	1.009	1.0082	1.0242	- .0160
M	.759	.7744	.8273	- .0529	M	1.019	1.0073	1.0254	- .0181
J	.777	.7959	.8352	- .0393	J	1.025	1.0063	1.0267	- .0204
J	.806	.8197	.8430	- .0233	J	1.031	1.0052	1.0283	- .0231
A	.835	.8449	.8509	- .0060	A	1.010	1.0037	1.0299	- .0262
S	.864	.8700	.8587	+ .0113	S	.993	1.0016	1.0319	- .0303
O	.894	.8940	.8666	+ .0274	O	.996	.9989	1.0339	- .0350
N	.921	.9155	.8743	+ .0412	N	1.004	.9956	1.0362	- .0406
D	.946	.9338	.8821	+ .0517	D	.975	.9918	1.0386	- .0468
1880					1885				
J	.966	.9483	.8896	+ .0587	J	.957	.9877	1.0411	- .0534
F	.982	.9588	.8972	+ .0616	F	.991	.9840	1.0438	- .0598
M	.989	.9654	.9047	+ .0607	M	1.004	.9812	1.0466	- .0654
A	.989	.9688	.9120	+ .0568	A	.996	.9800	1.0495	- .0695
M	.978	.9696	.9190	+ .0506	M	.987	.9813	1.0528	- .0715
J	.958	.9688	.9259	+ .0429	J	.982	.9852	1.0560	- .0708
J	.935	.9671	.9328	+ .0343	J	.993	.9921	1.0595	- .0674
A	.927	.9654	.9397	+ .0257	A	.996	1.0020	1.0632	- .0612
S	.935	.9641	.9463	+ .0178	S	.991	1.0144	1.0670	- .0526
O	.949	.9637	.9528	+ .0109	O	1.010	1.0289	1.0709	- .0420
N	.961	.9642	.9592	+ .0050	N	1.049	1.0451	1.0751	- .0300
D	.974	.9657	.9653	+ .0004	D	1.083	1.0624	1.0793	- .0169
1881					1886				
J	.987	.9682	.9709	- .0027	J	1.086	1.0805	1.0837	- .0032
F	.997	.9714	.9767	- .0053	F	1.078	1.0991	1.0882	+ .0109
M	1.001	.9754	.9820	- .0066	M	1.108	1.1179	1.0929	+ .0250
A	.999	.9798	.9871	- .0073	A	1.153	1.1362	1.0979	+ .0383
M	.991	.9844	.9918	- .0074	M	1.177	1.1532	1.1031	+ .0501
J	.984	.9891	.9966	- .0075	J	1.185	1.1683	1.1081	+ .0602
J	.977	.9937	1.0009	- .0072	J	1.180	1.1805	1.1136	+ .0669
A	.975	.9980	1.0048	- .0068	A	1.170	1.1893	1.1190	+ .0703
S	.980	1.0020	1.0084	- .0064	S	1.173	1.1946	1.1249	+ .0697
O	.986	1.0056	1.0117	- .0061	O	1.187	1.1966	1.1307	+ .0659
N	.998	1.0091	1.0147	- .0056	N	1.194	1.1961	1.1368	+ .0593
D	1.015	1.0125	1.0173	- .0048	D	1.200	1.1942	1.1427	+ .0515

¹ Except charcoal pig iron.

PIG IRON PRODUCTION

A299

TABLE 31—Continued

PIG IRON PRODUCTION¹ IN THE UNITED STATES

Date	1	2	3	4	Date	1	2	3	4
1887					1892				
J	1.211	1.1921	1.1486	+ .0435	J	1.412	1.4082	1.3276	+ .0806
F	1.219	1.1907	1.1546	+ .0361	F	1.413	1.4062	1.3252	+ .0810
M	1.223	1.1906	1.1605	+ .0301	M	1.407	1.3992	1.3228	+ .0764
A	1.231	1.1917	1.1665	+ .0252	A	1.389	1.3895	1.3204	+ .0691
M	1.166	1.1939	1.1727	+ .0212	M	1.370	1.3795	1.3180	+ .0615
J	1.084	1.1965	1.1786	+ .0179	J	1.360	1.3718	1.3156	+ .0562
J	1.113	1.1988	1.1846	+ .0142	J	1.344	1.3679	1.3132	+ .0547
A	1.188	1.2004	1.1905	+ .0099	A	1.322	1.3681	1.3108	+ .0573
S	1.245	1.2011	1.1962	+ .0049	S	1.326	1.3714	1.3087	+ .0627
O	1.264	1.2009	1.2018	- .0009	O	1.354	1.3760	1.3065	+ .0695
N	1.266	1.2002	1.2072	- .0070	N	1.377	1.3794	1.3043	+ .0751
D	1.255	1.1991	1.2125	- .0134	D	1.379	1.3793	1.3024	+ .0769
1888					1893				
J	1.211	1.1982	1.2179	- .0197	J	1.372	1.3741	1.3005	+ .0736
F	1.164	1.1978	1.2230	- .0252	F	1.376	1.3630	1.2986	+ .0644
M	1.161	1.1981	1.2279	- .0298	M	1.386	1.3461	1.2968	+ .0493
A	1.181	1.1994	1.2328	- .0334	A	1.393	1.3240	1.2951	+ .0289
M	1.193	1.2020	1.2373	- .0353	M	1.388	1.2976	1.2936	+ .0040
J	1.183	1.2061	1.2419	- .0358	J	1.354	1.2681	1.2921	- .0240
J	1.182	1.2118	1.2462	- .0344	J	1.254	1.2366	1.2907	- .0541
A	1.204	1.2191	1.2504	- .0313	A	1.114	1.2045	1.2896	- .0851
S	1.223	1.2276	1.2547	- .0271	S	1.027	1.1736	1.2885	- .1149
O	1.245	1.2368	1.2589	- .0221	O	1.021	1.1459	1.2876	- .1417
N	1.273	1.2459	1.2630	- .0171	N	1.095	1.1236	1.2870	- .1634
D	1.293	1.2542	1.2671	- .0129	D	1.146	1.1092	1.2866	- .1774
1889					1894				
J	1.291	1.2611	1.2711	- .0100	J	1.151	1.1042	1.2862	- .1820
F	1.283	1.2662	1.2751	- .0089	F	1.179	1.1092	1.2862	- .1770
M	1.284	1.2697	1.2792	- .0095	M	1.236	1.1237	1.2865	- .1628
A	1.273	1.2721	1.2832	- .0111	A	1.236	1.1459	1.2869	- .1410
M	1.254	1.2741	1.2871	- .0130	M	1.095	1.1730	1.2873	- .1143
J	1.247	1.2764	1.2912	- .0148	J	1.026	1.2018	1.2881	- .0863
J	1.256	1.2799	1.2952	- .0153	J	1.159	1.2298	1.2890	- .0592
A	1.260	1.2850	1.2991	- .0141	A	1.281	1.2549	1.2902	- .0353
S	1.273	1.2924	1.3030	- .0106	S	1.334	1.2764	1.2918	- .0154
O	1.305	1.3023	1.3069	- .0046	O	1.349	1.2947	1.2933	+ .0014
N	1.331	1.3146	1.3108	+ .0038	N	1.371	1.3105	1.2951	+ .0154
D	1.346	1.3291	1.3146	+ .0145	D	1.375	1.3246	1.2972	+ .0274
1890					1895				
J	1.355	1.3449	1.3182	+ .0267	J	1.363	1.3379	1.2996	+ .0383
F	1.366	1.3606	1.3219	+ .0387	F	1.345	1.3509	1.3019	+ .0490
M	1.376	1.3746	1.3252	+ .0494	M	1.335	1.3635	1.3046	+ .0589
A	1.381	1.3850	1.3283	+ .0567	A	1.331	1.3758	1.3073	+ .0685
M	1.385	1.3903	1.3312	+ .0591	M	1.329	1.3879	1.3101	+ .0778
J	1.379	1.3893	1.3340	+ .0553	J	1.351	1.4001	1.3132	+ .0869
J	1.361	1.3820	1.3365	+ .0455	J	1.386	1.4125	1.3166	+ .0959
A	1.355	1.3688	1.3386	+ .0302	A	1.423	1.4251	1.3200	+ .1051
S	1.371	1.3515	1.3402	+ .0113	S	1.453	1.4374	1.3235	+ .1139
O	1.377	1.3319	1.3416	- .0097	O	1.479	1.4481	1.3276	+ .1205
N	1.381	1.3123	1.3427	- .0304	N	1.494	1.4557	1.3316	+ .1241
D	1.363	1.2949	1.3436	- .0487	D	1.482	1.4583	1.3357	+ .1226
1891					1896				
J	1.300	1.2813	1.3440	- .0627	J	1.460	1.4547	1.3401	+ .1146
F	1.240	1.2729	1.3440	- .0711	F	1.437	1.4443	1.3449	+ .0994
M	1.179	1.2704	1.3438	- .0734	M	1.422	1.4276	1.3498	+ .0778
A	1.144	1.2739	1.3432	- .0693	A	1.420	1.4061	1.3549	+ .0512
M	1.211	1.2832	1.3424	- .0592	M	1.411	1.3820	1.3600	+ .0220
J	1.312	1.2976	1.3412	- .0436	J	1.396	1.3576	1.3656	+ .0080
J	1.362	1.3159	1.3400	- .0241	J	1.361	1.3353	1.3712	+ .0359
A	1.372	1.3367	1.3384	- .0017	A	1.286	1.3167	1.3767	+ .0600
S	1.390	1.3580	1.3364	+ .0216	S	1.208	1.3028	1.3822	+ .0794
O	1.414	1.3776	1.3345	+ .0431	O	1.200	1.2944	1.3882	+ .0938
N	1.423	1.3936	1.3323	+ .0613	N	1.259	1.2916	1.3939	+ .1023
D	1.420	1.4048	1.3301	+ .0747	D	1.317	1.2943	1.3998	+ .1055

¹ Except charcoal pig iron.

TABLE 31—Continued

PIG IRON PRODUCTION¹ IN THE UNITED STATES

Date	1	2	3	4	Date	1	2	3	4
1897					1902				
J	1.349	1.3024	1.4051	- .1027	J	1.666	1.6613	1.6359	+ .0254
F	1.366	1.3152	1.4107	- .0955	F	1.652	1.6625	1.6373	+ .0232
M	1.381	1.3321	1.4161	- .0840	M	1.668	1.6636	1.6389	+ .0247
A	1.386	1.3518	1.4216	- .0698	A	1.692	1.6651	1.6404	+ .0247
M	1.382	1.3732	1.4268	- .0536	M	1.697	1.6668	1.6421	+ .0247
J	1.375	1.3948	1.4318	- .0370	J	1.683	1.6690	1.6437	+ .0253
J	1.369	1.4152	1.4367	- .0215	J	1.668	1.6723	1.6453	+ .0270
A	1.394	1.4335	1.4415	- .0080	A	1.675	1.6769	1.6470	+ .0299
S	1.434	1.4491	1.4460	+ .0031	S	1.675	1.6832	1.6485	+ .0347
O	1.466	1.4618	1.4505	+ .0113	O	1.679	1.6908	1.6503	+ .0403
N	1.489	1.4720	1.4547	+ .0173	N	1.679	1.6990	1.6519	+ .0471
D	1.500	1.4800	1.4589	+ .0211	D	1.695	1.7069	1.6538	+ .0531
1898					1903				
J	1.500	1.4864	1.4628	+ .0236	J	1.677	1.7130	1.6558	+ .0572
F	1.503	1.4913	1.4667	+ .0246	F	1.696	1.7163	1.6579	+ .0584
M	1.507	1.4950	1.4704	+ .0246	M	1.710	1.7160	1.6602	+ .0558
A	1.505	1.4974	1.4740	+ .0234	A	1.729	1.7119	1.6627	+ .0492
M	1.497	1.4985	1.4776	+ .0209	M	1.743	1.7042	1.6653	+ .0389
J	1.485	1.4984	1.4813	+ .0171	J	1.746	1.6935	1.6682	+ .0253
J	1.472	1.4975	1.4851	+ .0124	J	1.698	1.6807	1.6714	+ .0093
A	1.471	1.4964	1.4889	+ .0075	A	1.705	1.6664	1.6747	+ .0083
S	1.482	1.4958	1.4929	+ .0029	S	1.714	1.6515	1.6780	- .0265
O	1.499	1.4965	1.4971	- .0006	O	1.663	1.6366	1.6819	- .0453
N	1.517	1.4987	1.5012	- .0025	N	1.540	1.6226	1.6858	- .0632
D	1.526	1.5029	1.5054	- .0025	D	1.436	1.6093	1.6898	- .0805
1899					1904				
J	1.526	1.5088	1.5098	- .0010	J	1.474	1.5988	1.6939	- .0951
F	1.511	1.5162	1.5142	+ .0020	F	1.620	1.5920	1.6983	- .1063
M	1.518	1.5251	1.5189	+ .0062	M	1.670	1.5898	1.7029	- .1131
A	1.537	1.5350	1.5238	+ .0112	A	1.716	1.5930	1.7073	- .1143
M	1.543	1.5459	1.5390	+ .0169	M	1.695	1.6016	1.7119	- .1103
J	1.534	1.5576	1.5340	+ .0236	J	1.635	1.6150	1.7163	- .1013
J	1.565	1.5699	1.5393	+ .0306	J	1.558	1.6319	1.7208	- .0889
A	1.570	1.5823	1.5444	+ .0379	A	1.578	1.6507	1.7252	- .0745
S	1.581	1.5940	1.5497	+ .0443	S	1.656	1.6697	1.7296	- .0599
O	1.598	1.6041	1.5549	+ .0492	O	1.672	1.6878	1.7337	- .0459
N	1.612	1.6116	1.5602	+ .0514	N	1.695	1.7044	1.7375	- .0531
D	1.617	1.6156	1.5653	+ .0503	D	1.717	1.7195	1.7412	- .0217
1900					1905				
J	1.618	1.6154	1.5704	+ .0450	J	1.760	1.7333	1.7449	- .0116
F	1.618	1.6111	1.5753	+ .0358	F	1.756	1.7464	1.7481	- .0017
M	1.612	1.6028	1.5800	+ .0228	M	1.796	1.7591	1.7512	+ .0079
A	1.613	1.5916	1.5845	+ .0071	A	1.807	1.7714	1.7539	+ .0175
M	1.618	1.5788	1.5890	- .0102	M	1.802	1.7830	1.7566	+ .0264
J	1.607	1.5658	1.5931	- .0273	J	1.777	1.7933	1.7588	+ .0345
J	1.563	1.5540	1.5970	- .0430	J	1.750	1.8018	1.7610	+ .0408
A	1.496	1.5449	1.6005	- .0556	A	1.774	1.8081	1.7629	+ .0452
S	1.516	1.5392	1.6041	- .0649	S	1.802	1.8123	1.7647	+ .0476
O	1.480	1.5375	1.6072	- .0697	O	1.821	1.8149	1.7662	+ .0487
N	1.488	1.5400	1.6102	- .0702	N	1.827	1.8165	1.7677	+ .0488
D	1.523	1.5466	1.6129	- .0663	D	1.819	1.8177	1.7692	+ .0485
1901					1906				
J	1.573	1.5566	1.6152	- .0586	J	1.824	1.8190	1.7703	+ .0487
F	1.607	1.5694	1.6176	- .0482	F	1.833	1.8206	1.7716	+ .0490
M	1.614	1.5838	1.6197	- .0359	M	1.844	1.8222	1.7727	+ .0495
A	1.621	1.5989	1.6216	- .0227	A	1.840	1.8236	1.7738	+ .0498
M	1.633	1.6134	1.6233	- .0099	M	1.831	1.8245	1.7745	+ .0500
J	1.640	1.6265	1.6250	+ .0015	J	1.819	1.8252	1.7756	+ .0496
J	1.644	1.6375	1.6266	+ .0109	J	1.813	1.8260	1.7765	+ .0495
A	1.638	1.6459	1.6282	+ .0177	A	1.793	1.8276	1.7773	+ .0503
S	1.640	1.6520	1.6298	+ .0222	S	1.818	1.8309	1.7780	+ .0529
O	1.649	1.6561	1.6312	+ .0249	O	1.850	1.8364	1.7788	+ .0576
N	1.657	1.6585	1.6328	+ .0257	N	1.863	1.8446	1.7795	+ .0651
D	1.611	1.6601	1.6343	+ .0258	D	1.858	1.8549	1.7802	+ .0747

¹ Except charcoal pig iron.

PIG IRON PRODUCTION

A301

TABLE 31—Continued

PIG IRON PRODUCTION¹ IN THE UNITED STATES

Date	1	2	3	4	Date	1	2	3	4
1907					1912				
J	1.852	1.8661	1.7809	+ .0852	J	1.822	1.8458	1.8748	- .0290
F	1.864	1.8735	1.7814	+ .0921	F	1.860	1.8567	1.8744	- .0177
M	1.856	1.8844	1.7819	+ .1025	M	1.890	1.8679	1.8740	- .0061
A	1.869	1.8873	1.7822	+ .1051	A	1.899	1.8794	1.8735	+ .0059
M	1.870	1.8836	1.7826	+ .1010	M	1.909	1.8908	1.8726	+ .0182
J	1.872	1.8722	1.7828	+ .0894	J	1.910	1.9019	1.8714	+ .0305
J	1.862	1.8531	1.7827	+ .0704	J	1.891	1.9125	1.8703	+ .0422
A	1.861	1.8268	1.7826	+ .0442	A	1.909	1.9225	1.8691	+ .0534
S	1.861	1.7945	1.7824	+ .0121	S	1.915	1.9316	1.8680	+ .0636
O	1.862	1.7584	1.7820	- .0236	O	1.938	1.9399	1.8668	+ .0731
N	1.877	1.7206	1.7815	- .0609	N	1.943	1.9469	1.8657	+ .0812
D	1.785	1.6835	1.7809	- .0974	D	1.953	1.9525	1.8649	+ .0876
	1.600								
1908					1913				
J	1.528	1.6497	1.7802	- .1305	J	1.955	1.9562	1.8640	+ .0922
F	1.570	1.6214	1.7795	- .1581	F	1.966	1.9575	1.8635	+ .0940
M	1.598	1.6001	1.7786	- .1785	M	1.950	1.9561	1.8631	+ .0930
A	1.584	1.5875	1.7779	- .1904	A	1.963	1.9518	1.8628	+ .0890
M	1.575	1.5838	1.7771	- .1933	M	1.959	1.9449	1.8629	+ .0820
J	1.561	1.5890	1.7764	- .1874	J	1.943	1.9358	1.8632	+ .0726
J	1.594	1.6019	1.7758	- .1739	J	1.917	1.9252	1.8637	+ .0615
A	1.642	1.6211	1.7754	- .1543	A	1.914	1.9138	1.8646	+ .0492
S	1.675	1.6444	1.7749	- .1307	S	1.922	1.9023	1.8655	+ .0368
O	1.704	1.6690	1.7749	- .1050	O	1.915	1.8911	1.8667	+ .0244
N	1.721	1.6957	1.7749	- .0792	N	1.872	1.8804	1.8681	+ .0123
D	1.749	1.7205	1.7752	- .0547	D	1.806	1.8699	1.8696	+ .0003
1909					1914				
J	1.763	1.7435	1.7757	- .0322	J	1.784	1.8593	1.8713	- .0120
F	1.785	1.7646	1.7764	- .0118	F	1.829	1.8481	1.8732	- .0251
M	1.772	1.7841	1.7774	+ .0067	M	1.879	1.8362	1.8751	- .0389
A	1.763	1.8024	1.7788	+ .0236	A	1.879	1.8234	1.8772	- .0538
M	1.784	1.8199	1.7801	+ .0398	M	1.829	1.8100	1.8796	- .0696
J	1.809	1.8374	1.7819	+ .0555	J	1.806	1.7965	1.8820	- .0855
J	1.832	1.8546	1.7839	+ .0707	J	1.800	1.7836	1.8845	- .1009
A	1.861	1.8714	1.7862	+ .0852	A	1.809	1.7722	1.8871	- .1149
S	1.900	1.8873	1.7887	+ .0986	S	1.798	1.7631	1.8900	- .1269
O	1.924	1.9013	1.7914	+ .1101	O	1.759	1.7574	1.8929	- .1355
N	1.929	1.9129	1.7944	+ .1185	N	1.704	1.7558	1.8961	- .1403
D	1.930	1.9207	1.7977	+ .1230	D	1.689	1.7590	1.8992	- .1402
1910					1915				
J	1.925	1.9243	1.8011	+ .1232	J	1.713	1.7676	1.9023	- .1347
F	1.933	1.9230	1.8048	+ .1182	F	1.777	1.7819	1.9058	- .1239
M	1.927	1.9172	1.8086	+ .1086	M	1.823	1.8015	1.9092	- .1077
A	1.918	1.9071	1.8124	+ .0947	A	1.849	1.8259	1.9129	- .0870
M	1.887	1.8937	1.8164	+ .0773	M	1.863	1.8538	1.9166	- .0628
J	1.878	1.8782	1.8207	+ .0575	J	1.900	1.8836	1.9205	- .0369
J	1.841	1.8619	1.8248	+ .0371	J	1.917	1.9136	1.9244	- .0108
A	1.832	1.8459	1.8291	+ .0168	A	1.953	1.9420	1.9283	+ .0137
S	1.836	1.8312	1.8334	- .0022	S	1.978	1.9674	1.9322	+ .0352
O	1.829	1.8183	1.8377	- .0194	O	2.003	1.9889	1.9364	+ .0525
N	1.804	1.8077	1.8419	- .0342	N	2.005	2.0059	1.9403	+ .0656
D	1.759	1.7994	1.8459	- .0465	D	2.014	2.0184	1.9443	+ .0741
1911					1916				
J	1.754	1.7934	1.8500	- .0566	J	2.012	2.0269	1.9484	+ .0785
F	1.807	1.7894	1.8537	- .0643	F	2.027	2.0319	1.9525	+ .0794
M	1.845	1.7874	1.8574	- .0700	M	2.032	2.0341	1.9566	+ .0775
A	1.838	1.7873	1.8607	- .0734	A	2.032	2.0342	1.9607	+ .0735
M	1.786	1.7889	1.8636	- .0747	M	2.035	2.0328	1.9627	+ .0682
J	1.775	1.7921	1.8662	- .0741	J	2.030	2.0305	1.9688	+ .0617
J	1.762	1.7967	1.8684	- .0717	J	2.017	2.0279	1.9729	+ .0550
A	1.793	1.8026	1.8704	- .0678	A	2.014	2.0255	1.9770	+ .0485
S	1.823	1.8095	1.8721	- .0626	S	2.028	2.0239	1.9811	+ .0428
O	1.831	1.8173	1.8732	- .0559	O	2.054	2.0234	1.9856	+ .0378
N	1.824	1.8260	1.8740	- .0480	N	2.043	2.0240	1.9898	+ .0342
D	1.819	1.8356	1.8744	- .0388	D	2.011	2.0254	1.9940	+ .0314

¹Except charcoal pig iron.

TABLE 31—Continued

PIG IRON PRODUCTION¹ IN THE UNITED STATES

Date	1	2	3	4	Date	1	2	3	4
1917					1922				
J	2.007	2.0272	1.9981	+ .0291	J	1.725	1.6958	1.8407	- .1449
F	1.975	2.0284	2.0023	+ .0261	F	1.765	1.7357	1.8437	- .1070
M	2.021	2.0286	2.0064	+ .0222	M	1.818	1.7734	1.8452	- .0718
A	2.046	2.0273	2.0104	+ .0169	A	1.839	1.8071	1.8479	- .0408
M	2.042	2.0243	2.0142	+ .0101	M	1.872	1.8365	1.8511	- .0146
J	2.037	2.0198	2.0176	+ .0022	J	1.896	1.8619	1.8546	+ .0073
J	2.033	2.0142	2.0207	- .0065	J	1.890	1.8844	1.8583	+ .0261
A	2.020	2.0081	2.0237	- .0156	A	1.768	1.9049	1.8623	+ .0426
S	2.019	2.0021	2.0262	- .0241	S	1.831	1.9248	1.8663	+ .0585
O	2.028	1.9968	2.0284	- .0316	O	1.930	1.9445	1.8707	- .0738
N	2.029	1.9930	2.0296	- .0366	N	1.978	1.9643	1.8753	+ .0890
D	1.968	1.9912	2.0302	- .0390	D	1.998	1.9840	1.8801	+ .1039
1918					1923				
J	1.891	1.9920	2.0304	- .0384	J	2.018	2.0033	1.8849	+ .1184
F	1.918	1.9956	2.0297	- .0341	F	2.029	2.0212	1.8898	+ .1314
M	2.016	2.0020	2.0284	- .0264	M	2.056	2.0372	1.8949	+ .1423
A	2.040	2.0109	2.0266	- .0157	A	2.073	2.0508	1.9001	+ .1507
M	2.046	2.0215	2.0242	- .0027	M	2.096	2.0614	1.9055	+ .1559
J	2.045	2.0327	2.0210	+ .0117	J	2.088	2.0683	1.9106	+ .1577
J	2.043	2.0426	2.0171	+ .0255	J	2.074	2.0709	1.9159	+ .1550
A	2.039	2.0497	2.0126	+ .0371	A	2.046	2.0686	1.9212	+ .1474
S	2.057	2.0523	2.0070	+ .0453	S	2.018	2.0606	1.9269	+ .1337
O	2.051	2.0492	2.0015	+ .0477	O	2.007	2.0471	1.9322	- .1149
N	2.048	2.0398	1.9952	+ .0446	N	1.984	2.0284	1.9376	- .0908
D	2.044	2.0247	1.9886	+ .0561	D	1.974	2.0037	1.9429	+ .0628
1919					1924				
J	2.027	2.0051	1.9813	+ .0238	J	1.988	1.9808	1.9483	+ .0325
F	2.021	1.9823	1.9739	+ .0084	F	2.025	1.9559	1.9536	+ .0023
M	1.999	1.9587	1.9664	- .0077	M	2.048	1.9333	1.9587	- .0254
A	1.917	1.9341	1.9590	- .0249	A	2.033	1.9148	1.9637	- .0489
M	1.833	1.9165	1.9513	- .0348	M	1.926	1.9016	1.9687	- .0671
J	1.848	1.9010	1.9440	- .0430	J	1.830	1.8942	1.9734	- .0792
J	1.894	1.8907	1.9366	- .0459	J	1.760	1.8924	1.9779	- .0855
A	1.947	1.8860	1.9291	- .0431	A	1.784	1.8955	1.9822	- .0867
S	1.919	1.8871	1.9215	- .0344	S	1.835	1.9028	1.9859	- .0831
O	1.779	1.8936	1.9146	- .0210	O	1.903	1.9132	1.9894	- .0762
N	1.902	1.9054	1.9078	- .0024	N	1.923	1.9258	1.9915	- .0657
D	1.929	1.9218	1.9011	+ .0207	D	1.980	1.9399	1.9953	- .0554
1920					1925				
J	1.988	1.9418	1.8952	+ .0466	J	2.036	1.9544	1.9978	- .0434
F	2.012	1.9643	1.8893	+ .0750	F	2.060	1.9683	1.9997	- .0314
M	2.037	1.9876	1.8838	+ .1038	M	2.061	1.9807	2.0013	- .0206
A	1.961	2.0092	1.8787	+ .1305	A	2.036	1.9904	2.0025	- .0121
M	1.984	2.0270	1.8738	+ .1532	M	1.976	1.9969	2.0034	- .0065
J	2.006	2.0383	1.8693	+ .1690	J	1.950	2.0000	2.0037	- .0037
J	1.995	2.0407	1.8651	+ .1756	J	1.934	2.0002	2.0039	- .0037
A	2.007	2.0324	1.8611	+ .1713	A	1.941	1.9986	2.0040	- .0054
S	2.018	2.0125	1.8572	+ .1553	S	1.958	1.9966	2.0039	- .0073
O	2.026	1.9811	1.8537	+ .1274	O	1.989	1.9959	2.0038	- .0079
N	1.990	1.9388	1.8504	+ .0884	N	2.003	1.9972	2.0034	- .0062
D	1.941	1.8877	1.8476	+ .0401	D	2.021	2.0011	2.0030	- .0019
1921					1926				
J	1.892	1.8308	1.8451	- .0143	J	2.029	2.0072	2.0026	+ .0046
F	1.840	1.7715	1.8427	- .0712	F	2.019	2.0145	2.0024	+ .0123
M	1.712	1.7135	1.8407	- .1272	M	2.045	2.0218	2.0025	+ .0193
A	1.600	1.6608	1.8391	- .1783	A	2.061	2.0281	2.0027	+ .0254
M	1.595	1.6168	1.8378	- .2210	M	2.050	2.0327	2.0030	+ .0297
J	1.550	1.5842	1.8371	- .2529	J	2.033	2.0353	2.0038	+ .0315
J	1.445	1.5650	1.8366	- .2716	J	2.017	2.0363	2.0048	+ .0315
A	1.488	1.5600	1.8364	- .2764	A	2.014	2.0359	2.0059	+ .0300
S	1.517	1.5684	1.8362	- .2678	S	2.019	2.0348	2.0073	+ .0275
O	1.604	1.5890	1.8369	- .2479	O	2.032	2.0333	2.0091	+ .0242
N	1.674	1.6193	1.8378	- .2185	N	2.033	2.0315	2.0109	+ .0206
D	1.726	1.6560	1.8391	- .1831	D	1.999	2.0293	2.0131	+ .0162

¹ Except charcoal pig iron.

PIG IRON PRODUCTION

A303

TABLE 31—Concluded

PIG IRON PRODUCTION¹ IN THE UNITED STATES

Date	1	2	3	4	Date	1	2	3	4
1927					1932				
J	2.001	2.0264	2.0155	+ .0109	J	1.497	1.5093		
F	2.021	2.0226	2.0181	+ .0045	F	1.522	1.4750		
M	2.051	2.0177	2.0207	- .0030	M	1.494	1.4407		
A	2.057	2.0119	2.0235	- .0116	A	1.454	1.4062		
M	2.039	2.0054	2.0264	- .0210	M	1.403	1.3719		
J	2.013	1.9986	2.0294	- .0308	J	1.321	1.3386		
J	1.979	1.9920	2.0323	- .0403	J	1.266	1.3081		
A	1.978	1.9859	2.0351	- .0492	A	1.233	1.2827		
S	1.966	1.9808	2.0376	- .0568	S	1.296	1.2651		
O	1.953	1.9770	2.0404	- .0634	O	1.318	1.2579		
N	1.946	1.9748	2.0428	- .0680	N	1.323	1.2624		
D	1.939	1.9743	2.0450	- .0707	D	1.246	1.2787		
1928					1933				
J	1.966	1.9756	2.0470	- .0714	J	1.264	1.3057		
F	2.000	1.9788	2.0487	- .0699	F	1.297	1.3411		
M	2.014	1.9836	2.0502	- .0666	M	1.243	1.3823		
A	2.026	1.9896	2.0513	- .0617	A	1.318	1.4271		
M	2.025	1.9965	2.0522	- .0557	M	1.457	1.4734		
J	2.012	2.0040	2.0523	- .0483	J	1.625	1.5200		
J	1.996	2.0118	2.0520	- .0402	J	1.762	1.5655		
A	2.005	2.0198	2.0513	- .0315	A	1.772	1.6086		
S	2.009	2.0280	2.0501	- .0221	S	1.705	1.6470		
O	2.037	2.0364	2.0484	- .0120	O	1.641	1.6785		
N	2.042	2.0447	2.0458	- .0009	N	1.558	1.7006		
D	2.036	2.0532	2.0423	+ .0109	D	1.581	1.7119		
1929					1934				
J	2.045	2.0609	2.0380	+ .0229	J	1.593	1.7118		
F	2.059	2.0676	2.0326	+ .0350	F	1.654	1.7021		
M	2.079	2.0726	2.0268	+ .0458	M	1.718	1.6854		
A	2.087	2.0755	2.0205	+ .0550	A	1.761	1.6650		
M	2.100	2.0762	2.0138	+ .0624	M	1.819			
J	2.093	2.0748			J	1.808			
J	2.087	2.0717			J	1.597			
A	2.083	2.0671			A	1.532			
S	2.067	2.0616			S	1.476			
O	2.064	2.0540			O	1.487			
N	2.026	2.0474			N	1.504			
D	1.961	2.0380			D	1.520			
1930					1935				
J	1.960	2.0266			J	1.678			
F	2.006	2.0129			F	1.759			
M	2.020	1.9970			M	1.757			
A	2.026	1.9792			A	1.744			
M	2.018	1.9602			M	1.746			
J	1.990	1.9407			J	1.714			
J	1.930	1.9211			J	1.691			
A	1.911	1.9019			A	1.754			
S	1.880	1.8829			S	1.772			
O	1.844	1.8638			O	1.805			
N	1.794	1.8444			N	1.838			
D	1.730	1.8246			D	1.832			
1931					1936				
J	1.743	1.8046			J	1.815			
F	1.785	1.7846							
M	1.817	1.7649							
A	1.828	1.7459							
M	1.808	1.7270							
J	1.737	1.7077							
J	1.674	1.6869							
A	1.616	1.6636							
S	1.591	1.6374							
O	1.578	1.6081							
N	1.566	1.5765							
D	1.500	1.5433							

¹ Except charcoal pig iron.

TABLE 32

UNITED STATES BUREAU OF LABOR STATISTICS INDEX NUMBER OF
WHOLESALE PRICES OF COMMODITIES, MONTHLY,
JANUARY 1890-JANUARY 1936

Col. 1. Logarithms of Index.

Col. 2. Cyclical Curve (logarithms).

For details of the nature of the graduation given in Column 2 of this table, see Appendix D.

WHOLESALE PRICES

A305

TABLE 32

	1	2		1	2		1	2		1	2
1890			1895			1900			1905		
J	1.7380	1.7396	J	1.6739	1.6832	J	1.7559	1.7524	J	1.7825	1.7792
F	1.7388	1.7406	F	1.6712	1.6857	F	1.7582	1.7543	F	1.7853	1.7793
M	1.7404	1.7420	M	1.6739	1.6882	M	1.7582	1.7553	M	1.7803	1.7793
A	1.7412	1.7438	A	1.6953	1.6904	A	1.7574	1.7553	A	1.7810	1.7792
M	1.7451	1.7460	M	1.6998	1.6922	M	1.7490	1.7545	M	1.7731	1.7790
J	1.7435	1.7483	J	1.7024	1.6936	J	1.7443	1.7529	J	1.7731	1.7790
J	1.7459	1.7507	J	1.6990	1.6943	J	1.7466	1.7509	J	1.7738	1.7785
A	1.7619	1.7531	A	1.6946	1.6942	A	1.7459	1.7483	A	1.7789	1.7784
S	1.7664	1.7532	S	1.6902	1.6932	S	1.7490	1.7456	S	1.7753	1.7784
O	1.7642	1.7571	O	1.6937	1.6911	O	1.7427	1.7431	O	1.7774	1.7785
N	1.7566	1.7587	N	1.6902	1.6880	N	1.7435	1.7408	N	1.7789	1.7788
D	1.7528	1.7595	D	1.6840	1.6842	D	1.7412	1.7390	D	1.7853	1.7796
1891			1896			1901			1906		
J	1.7490	1.7598	J	1.6812	1.6800	J	1.7419	1.7377	J	1.7860	1.7804
F	1.7528	1.7594	F	1.6767	1.6757	F	1.7380	1.7369	F	1.7839	1.7815
M	1.7619	1.7585	M	1.6712	1.6718	M	1.7364	1.7368	M	1.7825	1.7826
A	1.7649	1.7569	A	1.6693	1.6685	A	1.7356	1.7371	A	1.7860	1.7839
M	1.7597	1.7547	M	1.6628	1.6661	M	1.7332	1.7379	M	1.7875	1.7853
J	1.7466	1.7519	J	1.6580	1.6644	J	1.7332	1.7391	J	1.7875	1.7869
J	1.7443	1.7485	J	1.6542	1.6634	J	1.7364	1.7406	J	1.7760	1.7886
A	1.7435	1.7445	A	1.6542	1.6629	A	1.7435	1.7423	A	1.7868	1.7907
S	1.7388	1.7399	S	1.6561	1.6628	S	1.7490	1.7441	S	1.7903	1.7931
O	1.7372	1.7349	O	1.6684	1.6629	O	1.7490	1.7462	O	1.7980	1.7960
N	1.7348	1.7387	N	1.6822	1.6631	N	1.7528	1.7484	N	1.8035	1.7993
D	1.7308	1.7244	D	1.6776	1.6635	D	1.7612	1.7507	D	1.8082	1.8030
1892			1897			1902			1907		
J	1.7218	1.7196	J	1.6693	1.6638	J	1.7544	1.7533	J	1.8062	1.8069
F	1.7193	1.7155	F	1.6656	1.6642	F	1.7536	1.7561	F	1.8122	1.8106
M	1.7127	1.7126	M	1.6656	1.6647	M	1.7521	1.7592	M	1.8082	1.8140
A	1.7033	1.7111	A	1.6609	1.6653	A	1.7589	1.7624	A	1.8096	1.8166
M	1.7059	1.7112	M	1.6580	1.6662	M	1.7657	1.7650	M	1.8169	1.8183
J	1.7050	1.7128	J	1.6532	1.6673	J	1.7694	1.7695	J	1.8202	1.8189
J	1.7152	1.7158	J	1.6561	1.6689	J	1.7716	1.7731	J	1.8202	1.8184
A	1.7193	1.7198	A	1.6730	1.6711	A	1.7634	1.7765	A	1.8202	1.8169
S	1.7202	1.7244	S	1.6857	1.6737	S	1.7686	1.7795	S	1.8228	1.8146
O	1.7243	1.7292	O	1.6822	1.6767	O	1.8007	1.7820	O	1.8254	1.8117
N	1.7324	1.7337	N	1.6803	1.6799	N	1.7832	1.7837	N	1.8102	1.8085
D	1.7404	1.7376	D	1.6822	1.6829	D	1.7889	1.7846	D	1.8007	1.8053
1893			1898			1903			1908		
J	1.7528	1.7406	J	1.6812	1.6855	J	1.7966	1.7846	J	1.7945	1.8021
F	1.7574	1.7423	F	1.6866	1.6874	F	1.7924	1.7839	F	1.7882	1.7993
M	1.7497	1.7427	M	1.6884	1.6885	M	1.7803	1.7824	M	1.7910	1.7969
A	1.7451	1.7415	A	1.6893	1.6888	A	1.7782	1.7806	A	1.7938	1.7953
M	1.7404	1.7397	M	1.7143	1.6853	M	1.7709	1.7784	M	1.7938	1.7944
J	1.7259	1.7344	J	1.6840	1.6874	J	1.7709	1.7762	J	1.7966	1.7944
J	1.7152	1.7289	J	1.6812	1.6861	J	1.7679	1.7742	J	1.8000	1.7953
A	1.7016	1.7225	A	1.6812	1.6849	A	1.7694	1.7724	A	1.7993	1.7969
S	1.7160	1.7156	S	1.6794	1.6839	S	1.7745	1.7710	S	1.8014	1.7992
O	1.7235	1.7088	O	1.6785	1.6835	O	1.7686	1.7700	O	1.8028	1.8019
N	1.7093	1.7024	N	1.6812	1.6838	N	1.7657	1.7695	N	1.8069	1.8049
D	1.7024	1.6967	D	1.6840	1.6849	D	1.7649	1.7694	D	1.8116	1.8080
1894			1899			1904			1909		
J	1.6955	1.6919	J	1.6893	1.6872	J	1.7760	1.7697	J	1.8102	1.8112
F	1.6866	1.6879	F	1.6964	1.6906	F	1.7832	1.7703	F	1.8122	1.8144
M	1.6767	1.6846	M	1.6972	1.6952	M	1.7818	1.7711	M	1.8143	1.8177
A	1.6749	1.6819	A	1.7042	1.7008	A	1.7731	1.7721	A	1.8209	1.8212
M	1.6721	1.6797	M	1.7050	1.7072	M	1.7672	1.7732	M	1.8280	1.8249
J	1.6739	1.6780	J	1.7101	1.7142	J	1.7664	1.7744	J	1.8312	1.8288
J	1.6767	1.6767	J	1.7152	1.7214	J	1.7672	1.7754	J	1.8319	1.8330
A	1.6840	1.6762	A	1.7243	1.7283	A	1.7723	1.7764	A	1.8338	1.8374
S	1.6955	1.6763	S	1.7372	1.7348	S	1.7767	1.7772	S	1.8382	1.8418
O	1.6831	1.6772	O	1.7435	1.7406	O	1.7774	1.7780	O	1.8463	1.8461
N	1.6803	1.6787	N	1.7466	1.7455	N	1.7832	1.7785	N	1.8507	1.8501
D	1.6767	1.6808	D	1.7536	1.7494	D	1.7860	1.7789	D	1.8549	1.8535

TABLE 32—Continued

	1	2		1	2		1	2		1	2
1910			1915			1920			1925		
J	1.8537	1.8563	J	1.8332	1.8331	F	2.1978	2.1965	J	2.0124	2.0043
F	1.8531	1.8582	F	1.8363	1.8326	F	2.1962	2.2066	J	2.0170	2.0078
M	1.8627	1.8590	M	1.8338	1.8323	M	2.2003	2.2141	M	2.0179	2.0110
A	1.8645	1.8587	A	1.8370	1.8324	A	2.2188	2.2183	A	2.0082	2.0137
M	1.8573	1.8572	M	1.8389	1.8332	M	2.2232	2.2182	M	2.0069	2.0158
J	1.8513	1.8544	J	1.8344	1.8351	J	2.2214	2.2134	J	2.0128	2.0170
J	1.8513	1.8505	J	1.8407	1.8381	J	2.2196	2.2036	J	2.0183	2.0175
A	1.8500	1.8455	A	1.8363	1.8422	A	2.2079	2.1890	A	2.0166	2.0172
A	1.8445	1.8399	A	1.8344	1.8474	S	2.1909	2.1700	S	2.0145	2.0164
J	1.8319	1.8339	O	1.8463	1.8535	O	2.1590	2.1476	O	2.0154	2.0153
N	1.8222	1.8278	N	1.8555	1.8603	N	2.1252	2.1226	N	2.0191	2.0139
D	1.8235	1.8220	D	1.8592	1.8676	D	2.0817	2.0964	D	2.0145	2.0124
1911			1916			1921			1926		
J	1.8202	1.8168	J	1.8865	1.8754	J	2.0569	2.0703	J	2.0137	2.0109
F	1.8089	1.8124	F	1.8949	1.8835	F	2.0208	2.0453	F	2.0086	2.0094
M	1.8109	1.8090	M	1.9053	1.8919	M	2.0103	2.0226	M	2.0026	2.0078
A	1.8014	1.8067	A	1.9122	1.9006	A	1.9952	2.0031	A	2.0013	2.0061
M	1.7993	1.8055	M	1.9165	1.9098	M	1.9832	1.9871	M	2.0022	2.0042
J	1.7993	1.8053	J	1.9186	1.9196	J	1.9704	1.9751	J	2.0017	2.0021
J	1.8055	1.8062	J	1.9212	1.9300	J	1.9704	1.9668	J	1.9978	1.9998
A	1.8162	1.8081	A	1.9299	1.9413	A	1.9708	1.9619	A	1.9961	1.9972
J	1.8202	1.8107	S	1.9390	1.9535	S	1.9704	1.9598	S	1.9987	1.9945
O	1.8200	1.8139	O	1.9595	1.9667	O	1.9736	1.9600	O	1.9974	1.9918
N	1.8189	1.8173	N	1.9886	1.9809	N	1.9741	1.9616	N	1.9930	1.9891
D	1.8149	1.8213	D	1.9965	1.9958	D	1.9680	1.9642	D	1.9908	1.9866
1912			1917			1922			1927		
J	1.8195	1.8252	J	2.0090	2.0111	J	1.9610	1.9673	J	1.9845	1.9842
F	1.8241	1.8290	F	2.0191	2.0263	F	1.9680	1.9705	F	1.9814	1.9822
M	1.8293	1.8325	M	2.0322	2.0407	M	1.9676	1.9739	M	1.9764	1.9804
A	1.8432	1.8357	A	2.0573	2.0539	A	1.9694	1.9775	A	1.9736	1.9790
M	1.8451	1.8386	M	2.0817	2.0654	M	1.9827	1.9812	M	1.9741	1.9779
J	1.8389	1.8410	J	2.0864	2.0740	J	1.9836	1.9853	J	1.9741	1.9773
J	1.8382	1.8429	J	2.0899	2.0822	J	1.9974	1.9895	J	1.9745	1.9772
A	1.8432	1.8444	A	2.0962	2.0876	A	1.9939	1.9939	A	1.9786	1.9776
J	1.8482	1.8453	J	2.0917	2.0913	S	1.9970	1.9981	S	1.9836	1.9783
A	1.8500	1.8459	O	2.0871	2.0938	O	1.9983	2.0019	O	1.9850	1.9795
S	1.8463	1.8460	N	2.0892	2.0957	N	2.0022	2.0051	N	1.9836	1.9809
D	1.8457	1.8460	D	2.0896	2.0973	D	2.0030	2.0074	D	1.9841	1.9825
1913			1918			1923			1928		
J	1.8470	1.8458	J	2.0969	2.0992	J	2.0086	2.0088	J	1.9841	1.9839
F	1.8439	1.8455	F	2.0888	2.1015	F	2.0141	2.0094	F	1.9814	1.9852
M	1.8445	1.8452	M	2.1018	2.1044	M	2.0191	2.0092	M	1.9800	1.9862
A	1.8432	1.8448	A	2.1082	2.1078	A	2.0166	2.0083	A	1.9850	1.9868
M	1.8382	1.8445	M	2.1076	2.1114	M	2.0082	2.0071	M	1.9890	1.9871
J	1.8389	1.8440	J	2.1106	2.1152	J	2.0013	2.0055	J	1.9854	1.9870
J	1.8420	1.8435	J	2.1206	2.1188	J	1.9930	2.0036	J	1.9886	1.9867
A	1.8432	1.8427	A	2.1281	2.1220	A	1.9903	2.0015	A	1.9895	1.9862
J	1.8488	1.8419	S	2.1383	2.1246	S	1.9987	1.9992	S	1.9939	1.9865
A	1.8476	1.8410	O	2.1345	2.1265	O	1.9974	1.9967	O	1.9854	1.9849
S	1.8457	1.8400	N	2.1345	2.1276	N	1.9930	1.9942	N	1.9814	1.9843
D	1.8395	1.8389	D	2.1345	2.1281	D	1.9917	1.9918	D	1.9814	1.9838
1914			1919			1924			1929		
J	1.8363	1.8378	J	2.1284	2.1281	J	1.9983	1.9896	J	1.9818	1.9833
F	1.8344	1.8368	F	2.1133	2.1280	F	1.9987	1.9878	F	1.9796	1.9828
M	1.8325	1.8357	M	2.1183	2.1279	M	1.9934	1.9866	M	1.9827	1.9824
A	1.8300	1.8347	A	2.1239	2.1284	A	1.9881	1.9859	A	1.9800	1.9820
M	1.8287	1.8340	M	2.1313	2.1298	M	1.9818	1.9859	M	1.9764	1.9816
J	1.8287	1.8334	J	2.1323	2.1326	J	1.9773	1.9865	J	1.9786	1.9811
J	1.8280	1.8331	J	2.1495	2.1371	J	1.9805	1.9877	J	1.9845	1.9806
A	1.8426	1.8332	A	2.1593	2.1435	A	1.9868	1.9894	A	1.9836	1.9795
J	1.8463	1.8332	S	2.1495	2.1518	S	1.9872	1.9916	S	1.9827	1.9781
O	1.8325	1.8336	O	2.1511	2.1619	O	1.9921	1.9943	O	1.9782	1.9761
N	1.8293	1.8337	N	2.1599	2.1733	N	1.9961	1.9974	N	1.9708	1.9736
D	1.8280	1.8335	D	2.1775	2.1851	D	2.0065	2.0008	D	1.9699	1.9704

WHOLESALE PRICES

A307

TABLE 32—Concluded

	1	2		1	2		1	2		1	2
1930			1932			1934			1936		
J	1.9661	1.9666	J	1.8280	1.8310	J	1.8585	1.8620	J	1.9063	
F	1.9610	1.9622	F	1.8215	1.8275	F	1.8669	1.8658			
M	1.9552	1.9574	M	1.8195	1.8241	M	1.8675	1.8685			
A	1.9542	1.9521	A	1.8162	1.8206	A	1.8651	1.8707			
M	1.9484	1.9464	M	1.8089	1.8168	M	1.8675				
J	1.9385	1.9404	J	1.8055	1.8127	J	1.8727				
J	1.9263	1.9340	J	1.8096	1.8084	J	1.8739				
A	1.9258	1.9275	A	1.8143	1.8040	A	1.8831				
S	1.9263	1.9207	S	1.8149	1.7999	S	1.8899				
O	1.9191	1.9139	O	1.8089	1.7965	O	1.8837				
N	1.9101	1.9070	N	1.8055	1.7939	N	1.8837				
D	1.9009	1.9003	D	1.7966	1.7926	D	1.8859				
1931			1933			1935					
J	1.8932	1.8937	J	1.7853	1.7925	J	1.8965				
F	1.8854	1.8873	F	1.7767	1.7939	F	1.9004				
M	1.8808	1.8812	M	1.7796	1.7967	M	1.8998				
A	1.8739	1.8754	A	1.7810	1.8009	A	1.9036				
M	1.8645	1.8697	M	1.7973	1.8064	M	1.9042				
J	1.8579	1.8641	J	1.8129	1.8130	J	1.9020				
J	1.8573	1.8586	J	1.8382	1.8204	J	1.8998				
A	1.8579	1.8532	A	1.8420	1.8283	A	1.9058				
S	1.8525	1.8480	S	1.8500	1.8364	S	1.9069				
O	1.8470	1.8432	O	1.8525	1.8441	O	1.9058				
N	1.8463	1.8387	N	1.8519	1.8512	N	1.9063				
D	1.8363	1.8346	D	1.8500	1.8572	D	1.9080				

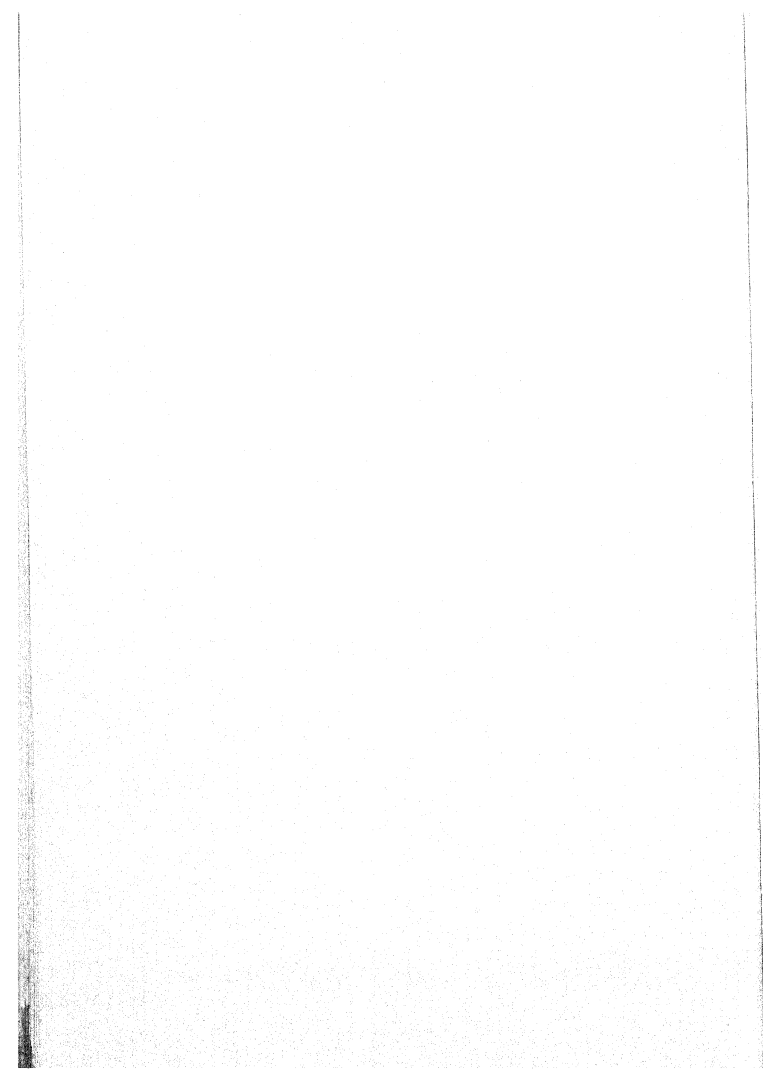
TABLE 33

DR. WESLEY C. MITCHELL'S DATES OF HIGH AND LOW POINTS IN
GENERAL BUSINESS IN THE UNITED STATES

(See *Recent Economic Changes*, Vol. II, p. 892, National Bureau of Economic Research
Inc., 1929.)

High		Low	
June.....	1857	December.....	1858
October.....	1860	June.....	1861
April.....	1865	December.....	1867
June.....	1869	December.....	1870
October.....	1873	March.....	1879
March.....	1882	May.....	1885
March.....	1887	April.....	1888
July.....	1890	May.....	1891
January.....	1893	June.....	1894
December.....	1895	June.....	1897
June.....	1899	December.....	1900
September.....	1902	August.....	1904
May.....	1907	June.....	1908
January.....	1910	January.....	1912
January.....	1913	December.....	1914
August.....	1913	April.....	1919
January.....	1920	September.....	1921
May.....	1923	July.....	1924
October.....	1926	December.....	1927
June.....	1929	March.....	1933

APPENDIX B



APPENDIX B

PROFESSOR IRVING FISHER'S STATISTICAL MEASURES
OF 'PRICE CHANGE'

IN DISCUSSING the relations between commodity prices and interest rates, Professor Irving Fisher designates *level* of commodity prices by the letter P , and *changes in that level* by P' . He uses a third symbol \bar{P}' to represent various moving averages of P' . In the course of merely verbal discussion, as distinct from mathematical or statistical presentation, P is usually referred to as 'commodity price level', and P' as 'change in commodity price level'. The third symbol \bar{P}' is usually defined in a semi-mathematical fashion either as 'the distributed lag of P'' or as 'the weighted average of sundry successive P'' s'.¹

The symbol P , or the *level* of commodity prices, is defined mathematically as the successive values of an 'index number' of commodity prices. It may represent almost any index number that is readily available and that seems adequate for the particular purpose at hand. When discussing interest rates and commodity prices in the United States, Professor Fisher lets P represent one of the index numbers of American wholesale prices constructed by the United States Bureau of Labor Statistics.

The second symbol, P' , is repeatedly referred to merely as 'price change'.² But that expression seems always to be used as a contraction or abbreviation of the longer expression 'rate of price change'. Even when Professor Fisher seems to have deliberately defined P' as 'price change' rather than 'rate of price change', the context will usually show that the latter is really meant.³ The emphasized characteristics of P' are always those of a ratio or a function of a ratio,

¹ Cf. Irving Fisher, *The Theory of Interest*, p. 419.

² '... i stands for interest rate and P' for price change ...' *The Theory of Interest*, p. 412.

³ In Chart 44, price change (P') is represented ... *Ibid.*, p. 414.

⁴ For example, '... the price change (P') is assumed to be at the rate of 5 per cent per annum' (*The Theory of Interest*, p. 413). If the author had intended P' to mean 'rate of

rather than those of an arithmetic 'difference'. The various mathematical definitions are all such that the value of P' would be unaffected by *multiplying* by a constant the successive terms of the price index number from which it is calculated. But its value would be definitely changed by *adding* a constant to, or *subtracting* a constant from, those terms.

The third symbol, \bar{P}' , is mathematically always just what it is stated to be, 'a weighted average of sundry successive P' 's'. But this is essentially an operative rather than an explanatory definition. It describes one way in which \bar{P}' may be calculated; but, in the absence of analysis, throws little light on what \bar{P}' means.

Professor Fisher verbally defines P' as the change in prices from one month (or year) to the next. He has proposed two arithmetic methods of measuring this 'change'. These arithmetic statements are, of course, the real definitions. The first of these arithmetic definitions appeared in an article published in 1923.⁴ It was given as a measure of the rise or fall of prices 'for each month'. It was calculated for any particular month by dividing the price index for the succeeding month by the price index for the preceding month and subtracting unity. In other words, if the index numbers for three consecutive months be designated a , b , c , the value of P' for the month whose price index was b would be $\frac{c}{a} - 1$. This is one one-hundredth or one per cent of the percentage change in the price level from the first month to the third month. For example, if $a = 100$ and $c = 125$, P' would equal $\frac{25}{100}$.

It is not worth while to examine critically this 1923 definition of P' . Professor Fisher himself discarded it within eighteen months. Indeed, it is strange that, in December 1923, a year after the publication (December 1922) of his book *The Making of Index Numbers* with its detailed and exhaustive analysis of the problem of 'bias', he could

price change', we would expect him to have written '... the rate of price change (P') is assumed to be 5 per cent per annum'. However, on the chart (43) to which the discussion refers, we find such notations as $P' = 5\%$, $P' = 10\%$, etc.

⁴ "The Business Cycle largely a 'Dance of the Dollar'," *Journal of the American Statistical Association*, December 1923, pp. 1024-28.

have proposed defining P' as $\frac{c}{a} - 1$. For the function $\frac{c}{a} - 1$ has a pronounced upward 'bias'.⁵

The second arithmetic definition of P' appeared in an article published in 1925.⁶ In that article Professor Fisher proposed that the value of P' for the month whose price index is b be defined (if a, b, c be, as before, the index numbers for three consecutive months) as $\frac{c-a}{2b}$, or, 'on an annual basis', as $\frac{6(c-a)^{\text{note } 7}}{b}$. The value of $\frac{c-a}{2b}$ (or $\frac{6(c-a)}{b}$) is, of course, the same when a, b, c , are 0, 100, 10 when they are 95, 100, 105 or 99, 10, 100.

⁵ Professor Fisher speaks of P' , both when defined as $\frac{c}{a} - 1$ and when defined (in his later work) as $\frac{c-a}{2b}$, as the 'slope' of P and as the 'derivative' of P . But the reader must be warned that, for purposes of analogical comparison, he uses these strictly mathematical terms in a loose and colloquial manner.

Strictly speaking, only if a 'slope' is constant over a period can it be termed *the* 'slope' of a curve *during* the period. And, of course, only if there be a 'curve' in the strict mathematical sense of that term can there be a 'slope'. The 'slope' of a curve at a specified point on the curve is the trigonometric 'tangent' of the straight line (geometrically) tangent to the curve at the point. Only if the curve itself be a straight line can its 'slope' be constant.

If the time scales and the price scales were assumed to be so related that the price figures were expressed in the time scale (the time interval from the abscissa of a to the abscissa of c being taken as unity), and if the points whose ordinates were a and c were joined by a straight line, the slope of that line (throughout its length) would be $c - a$.

Of course, if a new curve were now constructed each of whose infinite number of ordinates was the natural logarithm (to the base e) of an ordinate of the original straight line having the same abscissa, $\frac{c}{a} - 1$, which equals $\frac{c-a}{a}$, would be the 'slope' of the tangent to this new curve at the point whose ordinate was $\log a$. But, as this new curve is *not* a straight line, only at this one point would $\frac{c}{a} - 1$ be its 'slope'.

⁶ "Our Unstable Dollar and the so-called Business Cycle", *Journal of the American Statistical Association*, Vol. XX, New Series No. 150, June 1925, pp. 179-202 incl.

⁷ "... a derivative of P , namely, the curve P' ... such that the *height* of P' is expressed by the same figure as the *slope* of P " (1925 article, p. 182). At the bottom of the page there is a note on the word *slope* which Professor Fisher had italicized. The note reads: "The slope for any given month is measured by subtracting the index for the *preceding* month from that for the *succeeding* month and reducing the result to a percentage of the given or intervening month. This percentage, being for two months, is multiplied by six to give a *per annum* rate."

The function $\frac{c-a}{2b}$ contains a totally irrelevant variable. The value of b has no more logical place in a measure of price change from the level a to the level c than has the altitude of a balloon an hour ago to its change in altitude during the past two hours. The change in altitude of the balloon may be calculated from the change in altitude during the first hour and the change during the second hour; but the altitude at the end of the first hour will not affect the change in altitude during the two hours.⁸

It may, of course, be argued that $\frac{c-a}{2b}$ is not intended to measure price change from the middle of the first month to the middle of the third month but from the beginning to the end of the second month; that we are not measuring the change in the altitude of the balloon during the past two hours but during the single hour that ended half an hour ago; that, for the determination (by interpolation) of the probable price level at the *beginning* of the second month, b is as important as a ; and, similarly, as important as c for the determination of the price level at the *end* of the second month.

But, after the acceptance of this condition, the difficulties reappear in full force as soon as any attempt is made to develop a rational and systematic scheme of interpolation that will yield $\frac{c-a}{2b}$ as a not-absurd function of the interpolated values, without introducing b otherwise than as it occurs in those interpolated values. For example, if the level of prices at the beginning of the second month be taken as the arithmetic average of a and b and the level at the end of the month as the arithmetic average of b and c , we are faced with the difficulty that a knowledge of the values of only these averages is insufficient to determine $\frac{c-a}{2b}$. The necessity of introducing b remains.⁹

⁸ Of course, b is only technically irrelevant if it is introduced in such a manner that it eventually cancels out. For example, $(\log c - \log b) + (\log b - \log a) = \log c - \log a$; and $\frac{c}{b} \times \frac{b}{a} = \frac{c}{a}$.

⁹ If, through the three points $(-\frac{1}{2}, \frac{a+b}{2})$, $(0, b)$, $(+\frac{1}{2}, \frac{b+c}{2})$, a second degree parabola ($y = A + Bx + Cx^2$) be drawn, and another curve be constructed such that each of its ordinates is the natural logarithm of an ordinate of this parabola, $\frac{c-a}{2b}$ will be the slope of this new curve at the point $(0, \log b)$. But, not merely has b been directly introduced, but the slope is at a point only.

By itself, P' or $\frac{c-a}{2b}$ is a highly erratic function. But Professor Fisher makes much more use of $\overline{P'}$ than of P' , and $\overline{P'}$ is definitely less erratic than P' . The cumulation of P' tends to iron out some of its irregularities.¹⁰ We discuss the reasons for this fact later in this appendix.

Professor Fisher describes $\overline{P'}$ as 'the distributed lag of P'' or as 'the weighted average of sundry successive P'' s'. It was in articles dealing with the relation of changes in commodity price levels to interest rates, bond yields and the activity of business in general that he approached the problem of deciding what particular weights should be assigned to the 'sundry successive P'' s'. He presented the hypothesis that any appreciable change in the general level of commodity prices influenced the level of interest rates, etc., for long periods, though the strength of such influence declined with the passage of time. Conversely, that though a present level of interest rates, for example, had been most powerfully affected by recent changes in commodity prices, it had also been influenced, though to a less degree, by changes that had occurred in the distant past.

One of Professor Fisher's early efforts to decide upon what relative weights should be assigned to the influences of recent and remote price changes led him to base those weights on the ordinates of a skew probability curve which had its maximum ordinate in the very near past. The present writer cannot say that he grieves over the fact that this hypothesis was soon thrown overboard. The combination of the $\frac{c-a}{2b}$ method of measuring P' and the skew-probability weights for $\overline{P'}$ would have left that latter function in a position to

¹⁰ Though the erratic nature of P' may be very clearly illustrated by means of cumulations and averages. The function $\frac{c-a}{2b}$ has no *systematic* upward or downward 'bias', but its cumulation can yield strange results. Consider, for example, a hypothetical monthly series running 1, 4, 16, 2, 8, 32, 4, 16, 64 . . . These figures show a pronounced upward trend; each is double that for the third month back. However, a moving three months' simple arithmetic average of the $\frac{c-a}{2b}$ functions is constant and *negative*.

Its value is always $-\frac{1}{16}$. If the series were presented in reverse order, it would of course show a pronounced downward trend. But the three months' moving average of the $\frac{c-a}{2b}$ functions would be constant and *positive*.

defy successfully any attempt at a simple presentation of its meaning. A right-angled triangle with the right angle on the x -axis and the maximum ordinate at the most recent month was substituted for the skew probability curve. Moreover, the renunciation was complete. It was no mere sop to the exigencies of computation. Professor Fisher announced that the results obtained with the right-angled triangle were distinctly more acceptable to him than were those that had been obtained through the use of the skew probability curve.¹¹ With the 'triangular' weighting, the function $\overline{P'}$ is defined as a weighted average of n successive P' 's in which the earliest P' has a weight of 1, the next in time a weight of 2, the third a weight of 3, and the n th (or most recent) P' a weight of n . The function $\overline{P'}$ therefore equals

$$\frac{P'_1 + 2P'_2 + 3P'_3 + \dots + nP'_n}{\Sigma n}.$$

Up to this point we have designated data by the letters a , b , and c because single letters are so easy to remember without confusion. But, as the discussion from now on is in terms of hyperbolic functions, a different nomenclature is desirable. For a , b , and c let us substitute the symbols e^{y_1} , e^{y_2} , e^{y_3} , where e stands for the base of the natural system of logarithms,¹² and y_1 , y_2 , y_3 are $\log a$, $\log b$, and $\log c$. Also, let $z_1 = y_2 - y_1$ and, in general, $z_n = y_{n+1} - y_n$; or in terms of the earlier notation, $z_1 = \log b - \log a$ and $z_2 = \log c - \log b$. In this new notation,

$$\begin{aligned} P'_n &= \frac{e^{y_{n+2}} - e^{y_n}}{2e^{y_{n+1}}} = \frac{1}{2}(e^{z_{n+1}} - e^{-z_n}) \\ &= \frac{1}{2} \left(\sinh z_{n+1} + \sinh z_n + 2 \sinh^2 \frac{z_{n+1}}{2} - 2 \sinh^2 \frac{z_n}{2} \right). \text{note } 13 \end{aligned}$$

¹¹ Compare *The Theory of Interest*, p. 421.

¹² Unless otherwise stated, the logarithms referred to in this appendix are 'natural' logarithms (to the base e) and not 'common' logarithms (to the base 10).

¹³ As $\sinh z$, or the 'hyperbolic sine of z ' equals $\frac{e^z - e^{-z}}{2}$, $2 \sinh^2 \frac{z}{2} + 1 = \frac{e^z + e^{-z}}{2}$.

Hence, $e^{z_{n+1}} = \sinh z_{n+1} + 2 \sinh^2 \frac{z_{n+1}}{2} + 1$ and

$$-e^{-z_n} = \sinh z_n - 2 \sinh^2 \frac{z_n}{2} - 1.$$

Now, it is apparent that, if $e^{y_{n+1}}$ be the geometric mean of e^{y_n} and $e^{y_{n+2}}$, z_n will equal z_{n+1} and hence the $\sinh^2 \frac{z}{2}$ terms in the expression for P' will cancel out and disappear. And, even with data that do not constitute a geometric progression, it is apparent that, if a total (or a simple unweighted arithmetic average) of n successive P'' 's be taken, all but the first and last of the $\sinh^2 \frac{z}{2}$ terms will cancel out and disappear. The unweighted arithmetic average of n successive P'' 's from P'_1 to P'_n equals

$$\frac{1}{2n} \left\{ (\sinh z_1 + 2 \sinh z_2 + 2 \sinh z_3 + \dots + 2 \sinh z_n + \sinh z_{n+1}) + 2 \left(\sinh^2 \frac{z_{n+1}}{2} - \sinh^2 \frac{z_1}{2} \right) \right\}.$$

Furthermore, the relative influence on the average exerted by the two \sinh^2 terms that remain will tend to decrease as the value of n is increased. There will always be $\frac{n}{2}$ times as many $\sinh z$ terms as there are $\sinh^2 \frac{z}{2}$ terms. If we assume (with Professor Fisher) that it is legitimate and proper to average arithmetically 'sundry successive P'' 's', we must conclude that the $\sinh z$ terms in the expression for P' are, at least for the purpose of analyzing the essential characteristics of such an average of P'' 's, fundamental and the $\sinh^2 \frac{z}{2}$ terms essentially extraneous and irrelevant.

And this conclusion (derived from the fact that the influence of the $\sinh^2 \frac{z}{2}$ terms tends to decrease *pari passu* with increases in the number of P'' 's in the average) is reinforced by considering some of the essential characteristics of these terms and of the complete functions of z_1 , and z_{n+1} . In the first place, though the function $\sinh^2 \frac{z}{2}$ may be thought of as a measure of *absolute* fluctuation, it cannot properly be thought of as a measure of advance or decline. Its value is not affected by the inherent algebraic sign of z . A decline of the data from 100 to 95 yields the same value for $\sinh^2 \frac{z}{2}$ as an advance from 95 to 100. And similarly with the expression

$\sinh^2 \frac{z_{n+1}}{2} = \sinh^2 \frac{z_1}{2}$. Whether this expression is, as a whole, positive or negative depends in no way on the inherent algebraic signs of z_{n+1} and z_1 .¹⁴ It depends only on the *absolute* values of z_{n+1} and z_1 and the external algebraic signs that precede $\sinh^2 \frac{z_{n+1}}{2}$ and $\sinh^2 \frac{z_1}{2}$. And the sign of the expression, even as thus derived, is, as may be seen from an examination of the complete function of z_{n+1} ,^{note 15} and the complete function of z_1 ,^{note 16} essentially arbitrary and accidental.

If we remember that a z is not a raw datum (*e.g.*, a price) but a function (the logarithm) of the ratio of a datum to the preceding datum, it would seem reasonable to assume that the time order of the z 's should not affect an arithmetic average of a function such as P' that is intended to measure data changes. In fact, the unweighted arithmetic average of successive P' 's is unaffected by the time order of any of the z 's except the earliest z and the latest z . But, unless z_{n+1} equals plus or minus z_1 , the average is affected by the time order of those two z 's. If the earliest z be substituted for the latest z and vice versa, the value of the average is altered. Though the $\sinh z$ terms in the average remain unchanged, *the sign of the $\sinh^2 \frac{z}{2}$ factor ($\sinh^2 \frac{z_{n+1}}{2} - \sinh^2 \frac{z_1}{2}$) is reversed*. If arithmetic averaging be considered legitimate, the case for treating as mere erratic elements the \sinh^2 terms in the average would seem complete.

The function $\overline{P'}$ is a weighted and not a simple arithmetic average of 'sundry successive P' 's'. But the conclusions we have arrived at concerning the essential irrelevancy of the \sinh^2 elements hold with respect to the weighted average as definitely as they hold with respect to the unweighted average. After the collection and cancellation of terms, $\overline{P'}$ ^{note 17} appears as

¹⁴ The expression will vanish if z_{n+1} equals *plus or minus* z_1 .

¹⁵ $\sinh z_{n+1} + 2 \sinh^2 \frac{z_{n+1}}{2}$.

¹⁶ $\sinh z_1 - 2 \sinh^2 \frac{z_1}{2}$.

¹⁷ $\overline{P'} = \frac{P'_1 + 2P'_2 + 3P'_3 + \dots + nP'_n}{\Sigma n}$

higher power after unity, is, for the purposes of our present analysis, quite warranted.²¹

But, as $z_n = y_{n+1} - y_n$, this expression equals $(y_2 - y_1) + (3y_3 - 3y_2) + (5y_4 - 5y_3) + \dots + \left\{ (2n - 3)y_n - (2n - 3)y_{n-1} \right\} + \left\{ (2n - 1)y_{n+1} - (2n - 1)y_n \right\} + (ny_{n+2} - ny_{n+1})$, divided by $2 \sum n$; which equals $-y_1 - 2y_2 - 2y_3 - \dots - 2y_n - y_{n+1} + n(y_{n+1} + y_{n+2})$, divided by $2 \sum n$. If $Y_n = \frac{y_n + y_{n+1}}{2}$, this expression becomes

$$-Y_1, -Y_2, -Y_3 - \dots - Y_n + nY_{n+1}, \text{ divided by } \sum n, \text{ or}$$

$$\frac{2}{n+1} \left(Y_{n+1} - \frac{Y_1 + Y_2 + \dots + Y_n}{n} \right).$$

In other words, the value to which \bar{P}' approximates (if the month to month—or year to year—fluctuations of the data are not too violent—and they are not with commodity price index numbers) may be described as follows. Take a two-months' moving average of the logarithms of the data (or take the logarithms of the geometric means of adjacent values). With this average as new data, \bar{P}' will approximate $\frac{2}{n+1}$ times the deviation of a datum value from the arithmetic average of the n preceding data values.²² It is the deviation of the logarithm of present price from an average of the logarithms of past prices.

The function $\frac{2}{n+1} \left(Y_{n+1} - \frac{Y_1 + \dots + Y_n}{n} \right)$ is the *slope* of the straight line joining Y_{n+1} to the mid point of the moving average $\frac{Y_1 + \dots + Y_n}{n}$. It is therefore *technically* correct to describe it as a measure of rate of price change. For example, if the Y 's all fell on the straight line $Y = A + Bx$ (as would be the case if the original

²¹ If z be 'absolutely' small, $\sinh z$ does not differ greatly from z . For example, if prices one month are even as much as 125 per cent of what they were in the preceding month, the difference will be extremely small. If $e^z = 1.25$ then $z = .2231 \dots$ and $\sinh z = .2250 \dots$

²² If common, and not natural, logarithms are used, the result will, of course, be $0.434 \dots$ times \bar{P}' instead of \bar{P}' .

data fell on a compound interest curve), the function would always equal B . No matter what the value of n the arithmetic average of the Y 's would advance *pari passu* with the value of the most recent Y from which the average was to be subtracted.

But no such condition would exist if the Y 's fell on a periodic curve such as a sine curve (plus a constant). If n equalled the number²³ of data points in one period or 'cycle', the function points would lie on another sine curve of smaller amplitude or 'swing' than the data curve, *but with maxima and minima on the same dates*. With an adjusted scale, it would be an exact reproduction of the data curve, though it would be technically correct to describe it as a measure of rate of change of that curve. But it might easily be more misleading than enlightening to do so.

A sine curve has no long-term trend. In general, if the data show no definite long-term trend, the average of the Y 's will, if n be taken sufficiently large, tend to be virtually constant. And $\overline{P'}$ will therefore tend to reproduce the data—minus a constant.

There are innumerable examples of such trendless curves. Some of the most perfect are series that, from their mathematical nature, move within definite limits. The digits of the decimal development of an incommensurable number, such as the 707 calculated digits of π . The number of spots in each successive throw of a pair of dice. Percentages that cannot exceed one hundred, such as the percentage of blast furnaces in blast, etc.

Less perfect examples come from the field of percentages that never approach one hundred; the percentage of the population in receipt of poor relief, the percentage of banks in the hands of receivers, the ratio of bank reserves to bank deposits, etc.

But, even with series that possess unmistakable trends, $\overline{P'}$ may closely approximate P . If the fluctuations of the data (from which the average is to be subtracted) happen to be extremely large as compared with the movements of the average, $\overline{P'}$ will, over short periods, often virtually reproduce P .^{note 24}

²³ Or a multiple of that number.

²⁴ Compare *The Theory of Interest*, Chart 49 (opp. p. 426). In this chart are presented quarterly figures for $\overline{P'}$ and i (short term interest rates in the United States) for the period 1915–1927. In this period occurred the violent war and post-war movements

It is of course true, as Professor Fisher says, that "It certainly stands to reason that *in the long run* a high level of prices due to previous monetary and credit inflation ought not to be associated with any higher rate of interest than the low level before the inflation took place. It is inconceivable that, for instance, the rate of interest in France and Italy should tend to be permanently higher because of the depreciation of the franc and the lira, or that a billion-fold inflation as in Germany or Russia would, after stabilization, permanently elevate interest accordingly."²⁵

The function \bar{P}' compares prices with a moving-average base instead of with zero, and therefore cannot remain high indefinitely. But the statistical evidence that the particular base introduced by \bar{P}' is, even empirically, a good base is not strong. Correlations between P and i usually run higher than those between \bar{P}' and i .

And again, if the substitution of \bar{P}' for P , instead of lowering, raised the coefficients of correlation noticeably, it is questionable whether we would be warranted in assuming that it was because \bar{P}' was a 'weighted average of sundry successive P 's' rather than because it was a deviation of P from a moving base. Professor Fisher writes, "It seems fantastic, at first glance, to ascribe to events which occurred last century any influence affecting the rate of interest today."²⁶ If for the word 'events' we substitute the words 'commodity price changes' (which are the 'events' Professor Fisher is discussing) and for the words 'any influence' the particular measure of that influence Professor Fisher proposes, we might be tempted to counter with, 'Why only at *first* glance?' He immediately continues with, "And yet that is what the correlations with distributed effects of P' show." But is it?

of prices and interest rates. The value of n is huge, 120. The similarity between \bar{P}' and P , both of which are given in the chart, is striking. Professor Fisher found that the maximum correlation (+ 0.738) between \bar{P}' and i was obtained when n was made 120. But the correlation between P (the raw data) and i gave + 0.709 without lagging and, if i was lagged two quarters (half a year), + 0.891. (*The Theory of Interest*, pp. 427 and 431.)

²⁵ *The Theory of Interest*, p. 440. The italics are Professor Fisher's.

²⁶ *The Theory of Interest*, p. 428.

APPENDIX C



THE MEANING OF GOLD YIELDS OF BONDS PAYABLE
PRINCIPAL AND INTEREST IN CURRENCY

(See Table 19 and Charts 25, 26 and 28)

1. THE meaning of bond yields in a year such as 1925 in the United States when there was no problem of currency depreciation in terms of gold.

If a 5 per cent \$1000 face value bond, with interest payable semi-annually, four years to run, sells for \$1036.63, it is said to yield 4 per cent per annum to the purchaser.¹

Or, if the present value of each interest payment and of the principal payment be obtained by discounting at 2 per cent per half-year true discount each future payment, the sum of these present values will be \$1036.63. For example, there are eight interest payments of \$25, the first payable six months hence, the second one year hence, etc. There is also the principal payment of \$1000 payable four years hence. Now the present value of the first interest payment of \$25 is $\$25 \div 1.02$ or \$24.51; the present value of the second interest payment of \$25 is $\$25 \div (1.02)^2$ or \$24.03; etc. The use of 1.02 as a divisor instead of $\sqrt{1.04}$ is, as mentioned in note 1, a convention of the bond tables. Now, the present values of the eight interest payments of \$25 each and the principal payment of \$1000 are: \$24.51; \$24.03; \$23.56; \$23.10; \$22.64; \$22.20; \$21.76; \$21.34, and \$853.49. The total of these present values is \$1036.63, the price paid for the bond.

2. The meaning of a *gold yield* of a bond in a period of depreciated currency, when the interest and principal of the bond are both payable in currency.

Bond No. 5 in Appendix A, Table 3 is a New York and Harlem Railroad 7 per cent bond which matured May 1, 1873. The interest was payable May 1 and November 1.

The average greenback price of this bond in January 1865 was \$1038.75. The average gold price of greenbacks in January 1865 was \$46.3 in gold for \$100 in greenbacks. Multiplying \$1038.75 by .463, we obtain \$480.94 as the gold price of this Harlem bond in January 1865. The gold yield to maturity of this bond at this gold price was calculated and found to be 16.43 per cent per annum.

The meaning of this yield may be illustrated as follows: The gold

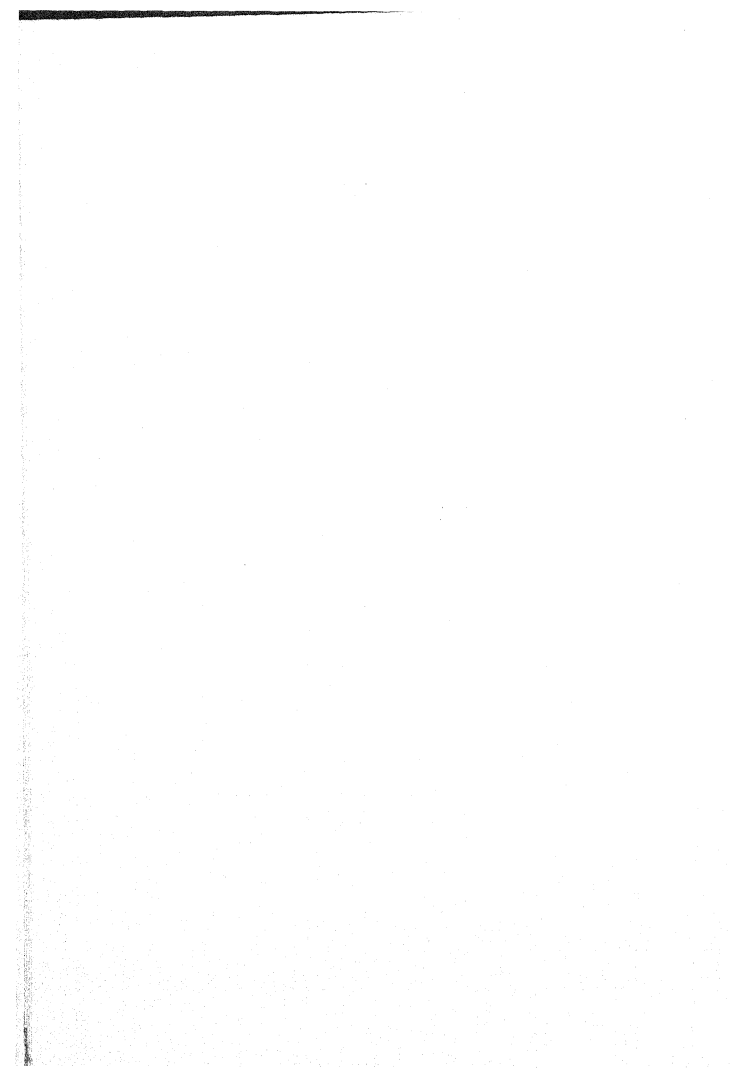
¹Really 2 per cent semi-annually under the convention on which the ordinary bond tables are constructed.

values of the seventeen future interest payments of \$35 each and the principal payment of \$1000 were, on the day on which each payment was made, \$24.32; \$23.99; \$27.77; \$23.81; \$25.83; \$24.86; \$25.11; \$26.26; \$25.96; \$27.30; \$30.39; \$31.44; \$31.44; \$31.20; \$31.15; \$31.18; \$29.90; \$854.25. Dividing the first interest payment by $1.04713^{(\text{note } 2)}$ the second interest payment by $(1.04713)(1.08215)$; the third interest payment by $(1.04713)(1.08215)^2$, etc., we obtain a set of present values in gold of the future gold values of the future currency interest payments of \$35 each and the currency principal payment of \$1000. These present values (in gold) were \$23.23; \$21.21; \$22.68; \$17.97; \$18.02; \$16.02; \$14.96; \$14.45; \$13.20; \$12.83; \$13.20; \$12.62; \$11.66; \$10.69; \$9.87; \$9.13; \$8.09; \$231.06. The total of these present values (in gold) is \$480.89—five cents less than the gold price of the bond in January 1865. The gold yield of the bond was therefore a trifle less than 16.43 per cent per annum.

The yield (4 per cent) referred to in the first section of this Appendix is a 'promised' yield. If all payments are made on time, it will also be a 'realized' yield. The yield (16.43 per cent) referred to in the second section is a 'realized' yield—if the payments are made on time. It, of course, cannot be a 'promised' yield as the future cannot be known.

² $1.04713 = (1.08215)^{\frac{7}{12}}$. Assuming the purchase as on the 15th of the month, there are only three and one-half months from date of purchase (January 15, 1865) to the first interest payment (May 1, 1865).

APPENDIX D



METHODS FOR COMPUTING CYCLICAL AND TREND
GRADUATIONS AND MOVING SEASONALS

CYCLICAL GRADUATION

THIS is a 'smoothing' or graduation designed to depict as well as possible what the various series would be like if all seasonal and merely erratic fluctuations were removed. It is calculated by taking a 5-month moving total of a 5-month moving total of an 8-month moving total of a 12-month moving total and applying to the results a 17-month weighted moving total with the following simple weights: +7, -10, 0, 0, 0, 0, 0, 0, +10, 0, 0, 0, 0, 0, -10, +7; the final results being divided by 9600. To obtain a value for any given month, data for 43 months are used, 21 preceding the given month and 21 succeeding it. It is a 'fifth degree parabolic graduation' in that it is designed to fit a curve exactly representable by an equation of the form

$$y = A + Bx + Cx^2 + Dx^3 + Ex^4 + Fx^5$$

as closely as is possible with such simple multiples as 7 and 10. Its other mathematical characteristics, including its ability to describe cyclical material such as could be represented by a superposition of sine curves of various periods, are discussed in full in *The Smoothing of Time Series*, by Frederick R. Macaulay (National Bureau of Economic Research, 1931), pp. 73-5, etc.

TREND GRADUATION

This is a 'third degree parabolic graduation'. It will fit almost exactly any curve representable by an equation of the form

$$y = A + Bx + Cx^2 + Dx^3.$$

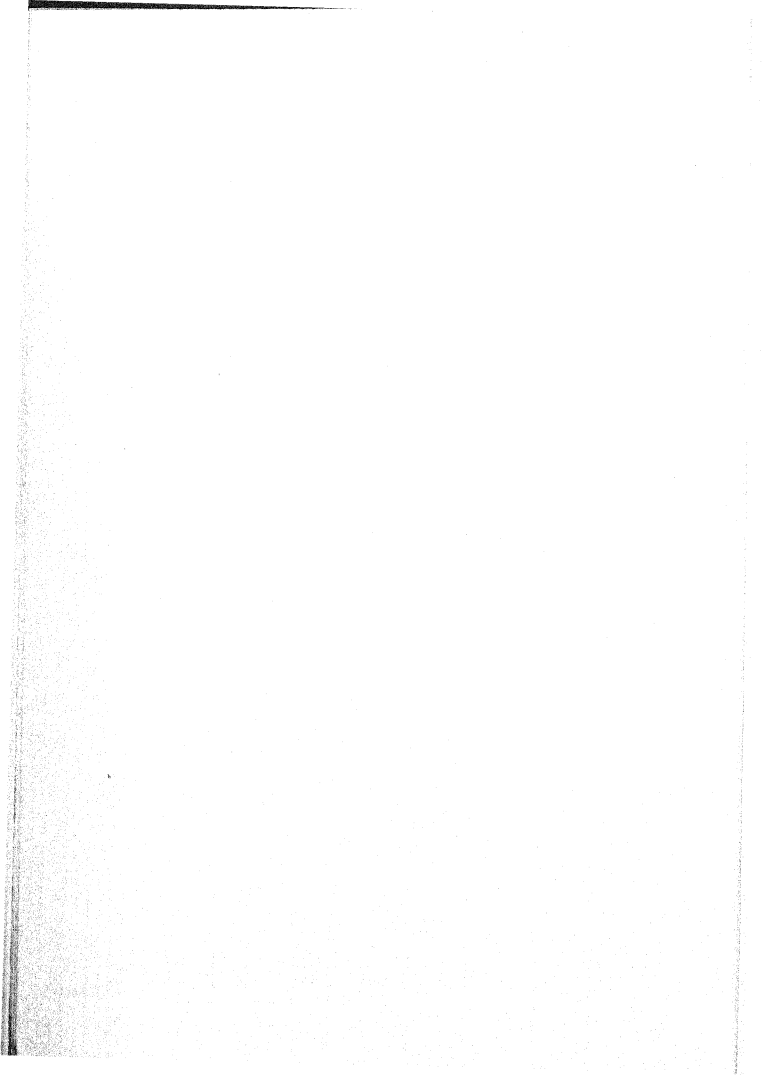
For a description of its mathematical characteristics see *The Smoothing of Time Series*, pp. 59-60, etc. To fit it to monthly data, take a 4-month moving total of an 8-month moving total of the data. Subtract a 17-month moving total of the data. Take a 2-month moving total of a 12-month moving total of the results. Divide by 360. This graduation was applied to the 43-term cyclical graduation described in the preceding section by taking as the 'months' to which this graduation was to be applied the Januaries, Mays, and Septembers of the 43-term graduation. Intermediate values were read off a large scale chart on which a smooth curve had been drawn through the calculated values with French curves.

MOVING SEASONALS

The moving seasonals of Chart 20 were constructed by taking a 7-month moving average of a 9-month moving average of the deviations of the data

for successive Januaries, Februaries, etc., from the 43-term graduation of the series as a whole. These twelve moving averages, one for each nominal month, were then smoothed with French curves. This preliminary moving seasonal was then corrected for irregularities in the algebraic sum of successive twelve-month periods by taking a 2-month moving average of a 12-month moving average of the preliminary moving seasonal and calling the deviations of the preliminary seasonal from this graduation the final moving seasonal.

APPENDIX E



SHORT TERM INTEREST RATES

THE MORE important of the short term interest rates presented in this study are those for call money, time money and commercial paper. The call money rates (Appendix A, Table 10, column 1 and Table 21) and the commercial paper rates (Appendix A, Table 10, column 3, and Table 23) are given monthly from January 1857; the time money rates (Appendix A, Table 10, column 2, and Table 22) from January 1890.¹ All three rates are from New York City markets. It was almost inevitable that these particular series should be chosen. No other short term interest series fulfilled so many of our requirements.²

First, the loans on which the rates are quoted are standardized. Though some call or time loans might carry higher or lower rates than those quoted, there was, at least hypothetically, a standard type of loan whose rate was quoted, and with which the non-standard loan could be compared.³ Commercial paper rates might fluctuate but the loans on which the quotations were made were standardized. It is true that the standardization of all three types of loan was much less exact in the earlier than in the later period. Moreover, the standard loan itself seems to have changed somewhat with the passage of years. 'Commercial paper' in the 'sixties or even 'seventies was a more speculative investment than in the 'nineties.

¹ For the reasons why the time money rates are carried back only to January 1890 see the section on time money.

² Two other series of short term interest rates are presented in this book: commercial paper rates in Boston monthly, January 1831 to December 1860, and rates for bankers' acceptances in New York, January 1918 to January 1936. The Boston commercial paper rates will be found in Appendix A, Tables 24 and 25 and the New York bankers' acceptance rates in Appendix A, Table 26. The Boston rates are given for their general interest and because New York rates for this early period before 1857 are not obtainable in any such carefully collected manner. The New York bankers' acceptance rates are presented for their own sake and because they are often useful in checking the significance of an apparent change in direction of movement.

³ The standard call or time loan in the earlier period was based on "mixed" collateral, worth in the market about 130 per cent of the amount of the loan. In the later period, 'all industrial' collateral began to be considered more and more acceptable. Non-standard loans were made at lower or higher rates. Collateral consisting entirely of government bonds usually called for a lower rate; collateral of a less marketable or more fluctuating type than the standard called for a higher rate. At present, curb market securities call for a higher rate than New York Stock Exchange securities.

Second, the published rates are in general accurate. Collection and publication seem to have been done usually with great regularity and care—though here again the rates of the earlier period are distinctly less reliable than those of the later period. However, even the early rates are seldom obscured by such hidden or difficult-to-measure considerations as the 'commissions' that occur in real estate mortgage transactions or the 'balances' required by banks of their customers.⁴

Third, all three rates are indices of money market conditions in New York City⁵ and hence have very direct relations to the New York stock and bond markets. Though money market conditions in other centers may often have an appreciable effect on the New York security markets, it is much less direct and immediate. While changes in the rediscount rate of even the Bank of England have sometimes had a marked influence on American money rates and on the movement of the prices of American stocks and bonds, it has always been indirect, and in the earlier period covered by this study it was almost always quite negligible.

Fourth, they are relatively adequate indices. In this respect they are unlike the rates charged by ordinary banks or the rates at which money is borrowed on real estate. Tightness in the call money market manifests itself primarily in high rates, and not, as in the real estate mortgage market, by difficulty of obtaining loans.

Fifth, the rates have almost always applied to large volumes of loans.

Sixth, they are rates that can be carried far back in time. Short

⁴ It is true that time loan rates have been, in some disturbed periods, quoted with 'commissions'. However, something can always be learned about the amount of such 'commissions' from the financial newspapers and magazines of the period. Moreover, there is an impersonality in the time loan market that is lacking in the case of loans of a bank to its regular customers, whose individual credit determines, to a considerable extent, the treatment they receive.

⁵ The fact that only a small proportion of the total borrowing of the country is done through call money, time money, or commercial paper (in the strict sense), but that most is done directly from the banks by their own commercial customers is not important for our purposes. These loans have no such homogeneity as the loans giving rise to the three rate series with which we are comparing them. Moreover, while they would be important in a discussion of the effect of interest charges on the cost of doing business, they do not have the direct relation to the security markets that is found in call rates, time rates or even commercial paper rates. Since the Federal Reserve system, with its rediscounting privileges, was established, the relation of commercial paper rates to time money rates is not so close as formerly.

economic series are often interesting and important but the dangers of generalizing from them are great. The newspapers and magazines are cluttered up with charts showing apparently interesting relationships between series extending over half a dozen years or so. All too often, when such series are extended over a longer period, it is found that the interesting relationships appear only in the half dozen years. The short term interest rate series presented in this study show interesting relationships over long periods.⁶

While the general nature of the loans giving rise to the three rates—on call money, time money, and commercial paper—is doubtless well known to the reader, a somewhat detailed description would seem appropriate at this point. Both call and time loans are made to stock or bond brokers, or to investment bankers, who place in the hands of the lenders stocks or bonds, or both, as collateral.⁷ The proceeds of these loans are used for the most part to finance speculative operations in the financial markets or the distribution of new issues of securities.⁸ 'Commercial paper' is a generic term applied to promissory notes on which merchants and manufacturers borrow money for use in the ordinary course of their business. No stock or bond collateral is deposited to secure the loan. The note may or may not bear an endorsement, and thus become 'two name' paper. Ordinarily the note

⁶ No series used for purposes of comparison in this book is carried further back than January 1857. The only series that could be carried further back, easily and with no decrease in accuracy, was that for clearings in New York City, which can be carried back to October 1853. Some deadline seemed highly desirable as comparisons between the series was the primary object. No better deadline presented itself than January 1857. For further discussion of this date, see Ch. III.

⁷ Call loans are sometimes made on the security of bankers' acceptances deposited with the lender. They usually bear a lower rate of interest than those having stocks or bonds as collateral, because the acceptance collateral enjoys an extremely dependable and steady market. The proceeds of this type of call loan are ordinarily used for a purpose different from that to which other call loans are put, and the volume of such call funds outstanding has never been of important proportions. The rates dealt with in this book apply only to call loans secured with stocks or bonds as collateral.

⁸ Of course, ordinary bank loans are often secured by the deposit of stocks or bonds as collateral, but they are not time loans. What are technically known as time loans are made to stock and bond brokers and investment bankers on securities as collateral, and, as already stated, the proceeds are almost invariably used for speculative and investment distribution purposes. It is in this technical sense that we use the term 'time loan'.

is accompanied by a financial statement of the borrower for the information of the purchaser of the paper. Generally, only those borrowers whose credit is well established and well known can make effective use of commercial paper as a means of procuring short term loans.

Neither call nor time loans are eligible for rediscount at the Federal Reserve banks. Commercial paper, when it meets the requirements laid down in the Federal Reserve Act, is eligible for rediscount.⁹ Call loans are made for an indefinite period but subject to call on twenty-four hours' notice, the rate of interest being adjustable from day to day.¹⁰ Time loans usually run from two to six months, though they are made for as short a period as one month or as long as six or seven months. Commercial paper now usually runs from four to six months. The amount of sixty to ninety day paper is at present quite negligible. Earlier, say before 1900, the proportion of such shorter term paper was much greater.

Call money rates are made in the New York Stock Exchange. The Money Committee of the New York Stock Exchange Clearing Corporation, after having studied the offerings from brokers and bankers whether made at fixed rates or at the market, and having examined the statements of brokers concerning what they wish to borrow and at what rates, fixes and posts at twenty minutes before eleven each morning a 'Renewal Rate'. This rate is set at the point that seems likely to result in placing a maximum amount of funds. This determination does not of itself, of course, obligate either borrower or lender to observe the rate. As a matter of fact, 'outside' rates, that is rates on transactions made elsewhere than at the money desk, often vary from the so-called 'official rate'—occasionally by

⁹ The term 'commercial paper' is given a special and rather precise definition in the Federal Reserve Act for the purposes of administering the system set up under that law. The words are employed in a somewhat more inclusive sense here.

¹⁰ Recent practice has developed what are sometimes called 'call loans specials'. These take the form of the ordinary call loan, but borrower and lender enter into a gentleman's agreement that renewals will be allowed from day to day at a fixed rate of interest for a specified term. Call loans made for sums over five thousand dollars are exempt from the New York State Usury Law. It is questionable whether time loans are exempt. It may also be noted that, generally speaking, call loans are now called as a matter of course in a somewhat more impersonal manner to suit the convenience of the lender than was formerly the case.

substantial margins. Nevertheless, in ordinary times some 95 per cent or more of the call loans, new and renewed, carry the renewal rate. There is no 'official' rate on new loans. The call money, rate employed throughout this book is the renewal rate, or in periods when exact information has been lacking, estimates of it.¹¹ Methods employed in these estimates are explained fully later in this appendix.

The years covered by this book fall into three periods with respect to the manner in which call rates on the New York Stock Exchange were actually made. In the first period, before September 1917, the rates were made at the 'Money Post' in almost exactly the same manner as the prices of stocks were made. The renewal rate was largely a matter of chance. After between \$2,000,000 and \$3,000,000 of new loans had been made, approximately the average of the rates of interest to be paid upon these loans was taken as the rate at which old loans should be renewed for that day. During the second period, September 1917-January 1919, the money market was under the supervision and control of the Money Committee. Since January 1919 the money desk on the floor of the Exchange has taken the place of the old 'money post'.¹²

¹¹ Formerly, the rates have sometimes varied very considerably according to the type of collateral, though variations due to this cause became less and less with the passage of time. The quotations used in constructing our index numbers were, in earlier times, those from 'mixed collateral'—i.e., rails and industrials listed on the New York Stock Exchange. At present, the distinction between rail and industrial collateral, for the purpose of determining rates, is not made.

¹² See Bartow Griffliss, *The New York Call Money Market*.

When a call loan is made, there are, of course, a lender and a borrower of money. Now, because the security behind the call loan is Stock Exchange collateral, there are a borrower and a lender of Stock Exchange collateral. The lender of money may be thought of as a borrower of collateral, and the borrower of money may be thought of as a lender of collateral. In general, they are not so thought of, because the essential element is that one individual wishes to borrow money and the other wishes to lend, while the passing of the collateral is thought of as a mere adjunct to the transaction. However, sometimes the demand is for collateral, not for money. When a broker has sold a stock short, he wishes to borrow that stock. He offers to lend money. However, when he wishes to borrow money, he must give a greater value of stock collateral than the amount of money that he wishes to borrow. When he wishes to borrow a stock, however, he must give a larger amount of money than the value of the stock. On this money that he lends the broker who lends him the stock he receives interest, though at a lower rate than the ruling rate for call loans. Sometimes this rate is so low as to be a zero, or even a minus rate. The stock is then said to be lending 'flat' or 'at a premium'. The rate of interest paid on this money is termed the 'lending rate on stocks' and is really a

Time loans are almost all placed by brokers acting as intermediaries between borrowers, usually stock brokers or investment bankers, and lenders, usually banks. There is no agency here performing functions similar or corresponding to the money desk of the New York Stock Exchange in the case of call loans.

The commercial paper market is an 'open market' in the sense that transactions are of a sort that do not bring the borrower and the lender into direct contact as is the case when a customer procures a loan from his bank. The borrower on commercial paper simply makes a promissory note, has it endorsed or not, according to circumstances (now ordinarily not), and offers it for sale to a broker, who buys it and holds it or, as is usually the case, sells it to a bank or other investor who wishes to place funds temporarily in such paper. The note may be bought and sold in this way several times before maturity. The holder at maturity, either directly or through a broker, presents it to the maker for payment. The rates on such loans naturally vary with maturity and also with the goodness of the name or names they bear. Such loans may be eligible for rediscount at the Reserve banks and their rates thus be more directly affected by the prevailing rediscount rate than are the rates of time loans, which are not eligible for rediscount. Member banks now as a matter of practice obtain needed funds from the Reserve system largely on their own notes with government bonds as collateral or upon customers' eligible paper without collateral.

The decrease during the last few years in the amount of commercial paper outstanding is due primarily to the elimination of the commercial paper 'broker'. Large corporations have established direct relations with entire chains of banks, and when they wish money they get it directly. Even smaller borrowers have recently tended more and more to deal directly with the banks. Bankers' acceptances have probably not taken up much of the commercial paper business. The overlap is small. For example, a large amount of commercial paper originates in the textile houses and these do not enter the acceptance (Footnote ¹² concluded)

peculiar type of call money. In the early days, when there was often a demand for government bonds, the rate of interest paid on loans that were secured by them was often much lower than the rate on loans secured by other collateral, no matter how good the collateral might be. This low rate of interest on loans secured by government bonds was really a type of call loan, in its nature between the lending rate on stocks and ordinary call money.

market. Cotton financing is the biggest item in the acceptance market.

It is extremely difficult to collect any very reliable and continuous series of quotations for short term interest rates in New York City before 1866.¹³ The *Commercial and Financial Chronicle* was first pub-

¹³ There is one source for early commercial paper rates (almost certainly Boston rates) giving practically continuous and apparently uniform quotations monthly as far back as January 1831: Bigelow and Martin. The Bigelow series runs from January 1831 to December 1860 monthly. The Martin series runs from January 1831 into the 'nineties. For the period 1831-60 Martin seems to have copied, or at least used, Bigelow's table. Bigelow's table of Boston (?) rates is reproduced in Appendix A, Table 25. Martin's table (for the period 1831-1860) is reproduced in Appendix A, Table 24.

Erastus B. Bigelow, inventor of the power loom, a New England mill owner, published in 1862, at Boston, a large quarto entitled *The Tariff Question . . . with statistical and comparative tables*. Appendix 112 (pp. 204, 205) contains a table entitled *Statement of the Comparative Rates of Interest in England, France and the United States each month in each year, from 1831 to 1860. Compiled from authentic sources*. The American rates are described as "Street Rates on First Class Paper in Boston and New York, at the beginning, middle and end of the month". Where this table contains two quotations for a month, interpretation is sometimes difficult. In his discussion of these rates (pp. 66-69) Bigelow makes no statement concerning the "authentic sources" from which his table was compiled. The book was noticed and the interest table copied in the London *Economist* of December 27, 1862, pp. 1434, 1435. Again no discussion of sources. The book was reviewed by Leslie Stephen in *MacMillan's Magazine*, Vol. 7, p. 126. No references were made there to the interest tables.

Joseph G. Martin, a Boston stock broker, published from 1856 to 1897 a series of books on the History of the Boston Stock Market. The first, *Twenty-one Years in the Boston Stock Market*, (Boston, 1856), contained no American interest rates. The second, *Seventy-three Years History of the Boston Stock Market* (Boston, 1871), contained a table (pp. 37-40) entitled Interest Rates for Money, 1831-1871. No statement is made in this table or elsewhere in the book whether these are New York or Boston rates. The only comment is: "The following rates are for first-class, three to six months, bankable paper." However, when Martin reprints the same series of interest rates in his later book, *One Hundred Years' History of the Boston Stock Market (1798-1898)*, he calls the series The Course of the Boston Money Market.

Now, in view of the facts that Martin's first book (1856) contained no American interest rates, that Bigelow's book appeared in 1862 and that the table in Martin's second book (1871) (as far as can be gathered from the form in which Martin presents his material) is almost identical with Bigelow's table for the years 1831 to 1860, it seems fair to assume that Martin's early figures were taken from Bigelow's book. However, in spite of the dates of publication, it is possible that Bigelow obtained his interest rates from unpublished material collected by Martin. Martin was intensely interested in all that related to the statistical history of the Boston stock and money markets and was continually collecting quotations of all kinds. A large amount of his unpublished manuscript material is now in the Widener Library, Harvard University.

lished July 1, 1865, but only gradually began its careful collection of short term interest rate material. Though the amount of data in existence for the period before 1866 is quite large, it is extremely irregular with respect to both quality and periods for which there are quotations. Moreover, upon close examination, the material that does exist is found to be extremely heterogeneous; variations in quoted rates for the same date are sometimes traceable to the fact that the quotations are for different types of loan and sometimes seem the result merely of obtaining information from different primary sources, such as different brokers.

At present, the chief *primary* sources for interest rates in New York City in the period before the publication of the *Commercial and Financial Chronicle* are the daily newspapers, *Hunt's Merchants' Magazine*, and the *Bankers' Magazine*. Of these sources, the newspapers, as a group, are much the most regular in their quotations. Nevertheless, it is impossible to work continuously with one paper. Any one paper either stops quoting or its quotations become unmistakably very inaccurate. One of the signs of such inaccuracy is the quoting of an unchanging rate day after day for long periods, the context showing that proper attention is not being given to the subject. It might be thought that if we always had at least one newspaper giving quotations our problem could be easily solved. However, the newspapers do not always agree. When quoting commercial paper they are not always quoting the same grade. This is especially important to watch in this early period. The rate of discount on commercial paper 'not well known' was often two or three times as great as on 'first class acceptances'. The newspapers rather commonly quote 'commercial paper' without any specifications as to grade. Moreover, there is unmistakable evidence that this did not always mean the highest grade.

Hunt's Merchants' Magazine and the *Bankers' Magazine* are even more irregular in their quotations than the newspapers. For example, neither quotes interest rates of any kind during the important year 1857. Moreover, the dangers involved in shifting back and forth from one to the other are just as real as in the case of the newspapers. (Footnote ¹⁸ concluded)

Martin calls the rates Boston rates, and Bigelow calls them Boston and New York rates. Now Boston and New York rates were not identical, and an examination of the newspapers and periodicals has convinced me that the Bigelow-Martin rates are Boston and not New York rates.

Quotations for what is termed the same type of loan continually vary. Neither *Hunt's Merchants' Magazine* nor the *Bankers' Magazine* is always a primary source. For example, when *Hunt's Merchants' Magazine* in January 1859 (Vol. 40, p. 76) begins to quote interest rates again (having lapsed for some years) and we find back rates for October 25, November 24, December 6 and December 14, 1858, we must not assume that all these figures are primary sources. The October and November figures are almost certainly taken from the *Bankers' Magazine* of December 1858 (p. 510). In the same way *Hunt's Merchants' Magazine* figures from May 1861 to October 1861 are from the *Bankers' Magazine*. Crude mistakes that are obviously due to errors in copying often appear. Numerous mistakes are apparent even when *Hunt's Merchants' Magazine* is copying from its own files.¹⁴

Aside from the general heterogeneity of the data, another source of embarrassment in the early period is the difficulty of obtaining quotations when the prevailing rates are high. There are two reasons for this difficulty. First, in times of financial panic all newspaper quotations tended to cease. Not only was there an apparent prejudice against publication but also it was often extremely difficult to discover what the rates really were. 'High and irregular' runs the legend. Second, because of the usury laws, high rates were disguised by means of 'commissions'.¹⁵

Secondary sources for interest rates in the period before 1866 are magazine and newspaper articles, and brokers' annual reviews. So few of these articles and reviews are still in existence that they are of little value except as partial checks on the accuracy of complete tables such as Bigelow's or those we have constructed for this volume. For the period January 1862 to December 1865 we have used Wesley

¹⁴ For example, comparison of dates in the table of rates in Vol. 42, p. 196 with the tables in Vol. 41, pp. 716, 580 and 452 is quite startling.

¹⁵ The *Commercial and Financial Chronicle* was the first journal to make any attempt at regularly quoting these commissions. The earlier publications seldom even mentioned commissions, let alone quoting them. As an example of the results of this practice, the reader may examine the table of interest rates for 1868-70 drawn up by the then Manager of the New York Clearing House (*Commercial and Financial Chronicle*, February 4, 1871, p. 138). The rate for each week in 1869 is given as 7 per cent. During 1869 call loan rates, as averaged from quotations in the *Commercial and Financial Chronicle*, exceeded 7 per cent nineteen weeks out of the fifty-two, while corresponding average weekly rates on commercial paper exceeded 7 per cent every week in the year.

C. Mitchell's table of monthly call loan rates given in his *History of the Greenbacks*, p. 367. We checked with original sources and decided that Dr. Mitchell's figures were probably as good as could be constructed for this very difficult period. Dr. Mitchell makes some comments on the inadequacy of the sources for this war period 1862-65.

"To my knowledge there are no systematic records of rates of interest on long-time business loans, and the data for short-time loans are unusually meagre and doubtful. In 1860, *Hunt's Merchant's Magazine* and the *Bankers' Magazine*—the most prominent business periodicals of the day—were publishing each month tables showing the rates of interest paid in New York for loans of several different kinds. But during the War, they ceased these systematic reports and one can glean from them but occasional scattering statements" (p. 365).

"Under these circumstances, it seems justifiable to attempt constructing a new table from the reports of the daily newspapers. On examination, however, one finds that this course also is open to objection. In the first place, regular statements can be found only for one kind of transaction—loans on call. In the second place, whenever the rates for call loans rise above 7 per cent the reporter is apt to say merely that the ruling rate is 'the legal maximum plus a small commission'. In the third place, one is justified in feeling some suspicions of the accuracy of newspaper reports. However, I have compiled a table from the financial columns of the newspapers of the rate for call loans every Saturday from 1862 to 1865. In doing so, I have been compelled to supplement one paper by another, for no one gives the reports with perfect regularity for the whole period" (pp. 366-7).

In the period January 1866 to January 1923 we have relied almost entirely on the *Commercial and Financial Chronicle* and its *Financial Review*. These two sources are practically identical. Where they differ we have in the earlier period given a little more consideration to the *Chronicle*, in the later period to the *Financial Review*. There is some evidence, both internal and external, that in the later period the figures in the *Chronicle* were reconsidered and checked before being incorporated in the *Review*. In periods of violent fluctuation, when highs and lows gave little evidence concerning averages, we have examined newspapers and magazines other than the *Chronicle*. However, we have kept as close to the *Chronicle* as we could, being convinced that it was the best source and also that it was extremely undesirable to

move from source to source if we wished to have a homogeneous series of quotations.

In the period January 1923 to January 1936 we have kept to the *Chronicle* for time money rates and commercial paper rates, but have used the *Federal Reserve Bulletin* figures for call money rates. These figures are monthly averages of the daily renewal rates given by the *Chronicle*.

The sources most used in obtaining the original data, from which the monthly averages were constructed, were:

I For Call Money Rates

- Jan. 1857—Dec. 1859 *Journal of Commerce*
Jan. 1860—Dec. 1861 *Hunt's Merchants' Magazine*
Jan. 1862—Dec. 1865 Wesley C. Mitchell's *History of the Greenbacks*
Jan. 1866—Dec. 1889 *Commercial and Financial Chronicle*
Jan. 1890—Dec. 1919 *Financial Review* (published by the *Commercial and Financial Chronicle*) and *Commercial and Financial Chronicle*
Jan. 1920—Dec. 1922 *Financial Review*
Jan. 1923—Jan. 1936 *Federal Reserve Bulletins*

II For 90-Day Time Money Rates

- Jan. 1890¹⁶—Dec. 1923 *Financial Review*
Jan. 1924 —Jan. 1936 *Commercial and Financial Chronicle*

III For 60 to 90 Day Commercial Paper Rates¹⁷

- Jan. 1857—Dec. 1859 *Journal of Commerce*
Jan. 1860—Dec. 1861 *Hunt's Merchants' Magazine and Bankers' Magazine*

¹⁶ No monthly index of time money rates was constructed further back than January 1890. Before the Federal Reserve system came into being, the movements of time money and of commercial paper rates were so similar that it is worth collecting figures for both rates only when the accuracy of the original data is sufficiently great to make the differences between the two rates significant. An examination of the sources for commercial paper rates and time money rates in the period before January 1890 suggests that significant differences between the two series would not be obtainable for very many years previous to 1890. In the earliest period it is practically impossible to get any continuous quotations for time money. However, beginning with January 1890, the *Commercial and Financial Chronicle* published in their *Financial Review*, each year, a very complete table of time money rates weekly for various maturities from thirty days to six months.

¹⁷ The rates for January 1857 to December 1865 are attempts to estimate what the rates were for 60-90 day prime double name paper. In this early period it is often

Jan. 1862—June 1862	<i>Hunt's Merchants' Magazine, Bankers' Magazine</i> and New York newspapers
July 1862—Dec. 1865	New York newspapers
Jan. 1866—Jan. 1936	<i>Financial Review</i> and <i>Commercial and Financial Chronicle</i>

The above sets of sources are the ones most used in each period. All possible sources were used in the earliest period. No single source stood out in the way that the *Commercial and Financial Chronicle* does after 1867. For example, though the *New York Journal of Commerce* call money rates were weighted more heavily from January 1857 to December 1859 than the rates obtained from any other single source, quotations for odd months in 1858 and the entire year 1859 were obtained from *Hunt's Merchants' Magazine* and the *Bankers' Magazine*. Quotations for 1859 were also obtained from the *New York Herald*. An attempt was made to weigh and consider these various quotations and to determine to what extent they should influence us, if at all, in accepting the figures of the *Journal of Commerce*.

For commercial paper rates during the same period, January 1857 to December 1859, we weighted most heavily the same source as was most heavily weighted for call money rates, namely the *Journal of Commerce*. However, the *Bankers' Magazine* was quoting throughout 1857, irregularly in 1858, and throughout 1859. *Hunt's Merchants' Magazine* was quoting rates twice a month in the later part of 1858 and throughout 1859. The New York Chamber of Commerce published a compilation of monthly rates for the year 1858. To go into details as to where each item was found would be wearisome and futile. It may be mentioned, however, that for the early period the following newspapers were carefully examined:

New York Herald

New York Evening Post (daily and semi-weekly)

New York Commercial Advertiser

New York Tribune (daily and semi-weekly)

New York Weekly Herald

(Footnote ¹⁷ concluded)

not clear what grade of paper is being quoted. The rates for January 1866 to December 1923 are for 60-90 day prime double name paper. The rates for January 1924 to January 1936 are for 4-6 month prime double (or single) name paper. In this period 60-90 day paper was quoted nominally at the same rate as 4-6 month paper. The amount of the shorter maturity paper was becoming negligible.

Journal of Commerce

New York Sun

New York Times

Shipping and Commercial List and New York Price Current

In some cases, a few hours were sufficient to convince one that nothing helpful in the way of either figures or text was to be found. In other cases, useful information was found here and there.

No intricate mathematical method of averaging was used in getting monthly figures from the daily newspaper quotations. All quotations, and remarks on rates, obtainable from the various papers for a particular month were tabulated and an estimated average made from careful inspection. There were, of course, many gaps in the daily quotations. Many simple little devices were used in connection with the various sources.

In the period January 1860 to December 1861, where the most used sources given in the table above are *Hunt's Merchants' Magazine* and the *Bankers' Magazine*, the rates used are almost exact arithmetic averages of the rates obtained from these two sources. Newspaper quotations were scanty but seemed to corroborate the magazine rates. In 1866 and 1867 we did not accept the rates from the *Chronicle* without question as we did in the later period. The quotations were carefully checked with other sources and final estimates made.¹⁸

¹⁸ We did not change Dr. Mitchell's figures for call money rates in the last six months of 1865 though compilations from the *Chronicle* gave appreciably different results, for we did not feel sufficient confidence in the accuracy of these earliest *Chronicle* figures. The rates we derived from the *Chronicle* compare as follows with Mitchell's rates derived from newspapers.

	1865	
	<i>Chronicle</i>	<i>Mitchell</i>
July	5.38	5.5
August	6.10	5.9
September	5.00	6.0
October	8.44	7.0
November	6.84	6.8
December	6.88	6.8

Before any conclusions are drawn from the table, attention should be called to the rather complicated manner in which the *Chronicle* was quoting all its rates at this time. Even the quotations for call money rates do not impress the reader with their adequacy and the commercial paper rates are almost unusable because they vary with the type of loan. Note the following quotations from the *Chronicle*:

The type of collateral influenced call money rates markedly for a considerable period during the regime of the national banking system. As an extreme example, attention may be drawn to the fact that loans on government bonds in the early days were somewhat analogous to loans based on short sales at present. In both cases, the real borrower—the party for whom the borrowing was most important—was the borrower of the security. Call loans with United States government bonds as collateral were made by banks to obtain bonds to deposit with the United States Treasury, in order that the bank might issue currency. They were primarily loans of government bonds, not loans of money.¹⁹

In the earlier period the call loan market was not developed to anything like its present degree. The call loan was not so strictly 'call' (Footnote ¹⁸ concluded)

July 8, 1865, p. 42

"... Dry goods bills are current at $6\frac{1}{2}$ to $7\frac{1}{2}$ per cent; grocers $6\frac{1}{2}$ to $7\frac{1}{2}$; produce commission $7\frac{1}{2}$ to 9 per cent."

July 15, 1865

"Discounts are dull. There is a larger supply of bills, especially of grocers, but the demand is quiet, the rates ranging from 6 to 10 per cent. We quote the best grades of the several classes of paper as follows:—

Dry Goods	$6\frac{1}{2}$ to 7	Bankers	6 to 7
Grocers	$6\frac{1}{2}$ to 7	Produce Commission	9 to 10"

November 11, 1865

"Prime bills pass at 7 to 9 per cent, and second class names at 10 to 15 per cent. Bankers bills are current at 7 to 8 per cent, dry goods commission at 8 to 10, produce commission at 9 to 12 per cent, grocers at 9 to 10 per cent."

March 31, 1866, p. 394

"The following are the rates for the various classes of loans:

	<i>per cent</i>
Call loans	5 to ..
Loans on bonds and mortgage	6 to 7
Prime endorsed bills 2 months	$6\frac{1}{2}$ to $7\frac{1}{2}$
Good endorsed bills 3 and 4 months	7 to 8
" " —single names	9 to 10
Lower grades	10 to 15"

These last quotations are in a form distinctly easier to handle than the form in which the preceding quotations appeared. By 1868 the *Chronicle* quotations are all relatively easy to use.

¹⁹ Compare . . . "the demand for Government Bonds was so large to put in the Treasury as collateral that the rates to Government Bond dealers fell off 3 per cent, although this transaction is rather a loan of Government Bonds than a loan of money" (*Commercial and Financial Chronicle*, March 29, 1879), p. 317.

as at present, and the market was not so impersonal as it has become.²⁰

In the period January 1890 to December 1923 almost complete reliance was placed on the time money figures contained in the *Financial Review* though for numerous dates these were checked and compared with the *Chronicle's* figures and text. This was especially true in periods when 'commissions' were being paid. The *Chronicle's* text was then used to help us to measure their effect on the rate actually paid. Throughout the period January 1890 to date the time loan rates are for loans with 'mixed collateral'.

In the period from 1857 to about 1910 our 'commercial paper' may be thought of as rather strictly rates for 60-90 day paper. After this period this short maturity paper becomes more and more rare, and the rates are, more and more, rates for 3 to 4 month paper. However, in this later period, what 60-90 day paper was made commonly went at the 3-4 month rate. After 1890, and until the very recent period, the quotations used were usually entitled 'double name choice 60-90 day paper'. In the early days where there were quotations for prime endorsed bills 2 month, and good endorsed bills 3 and 4 month, the method by which 'double name choice 60-90 day paper' was estimated was to use the quotation for 'prime endorsed bills 2 month' as the more important single piece of evidence, but sometimes to adjust the figures in the light of changes in the quotations for 'good endorsed bills 3 and 4 month', and sometimes in the light of the text. 'Prime paper' seemed usually to mean A No. 1 short time (2 month) endorsed notes.

Nearly all commercial paper is at present single name. In the earlier period there was a certain amount of extra fine two name paper. Present day newspaper and magazine quotations for 'double name choice 60-90 day paper' are really quotations for commercial paper that is neither 60-90 day nor two name. They are really quotations for 4 to 6 month high grade single name paper.

Commercial paper is made by the larger department and men's furnishing stores, jobbers of dry goods, hardware, shoes, groceries,

²⁰ Compare . . . "The precautionary feeling among lenders is naturally on the increase as the Fall months draw nearer, and its working is fairly illustrated in a circumstance we recently heard of a bank's calling in a loan from one party and lending to another at a much lower rate, simply because the latter was a better borrower and would pay up on call, without asking any extension" (*Ibid.*, August 16, 1873), p. 213.

floor coverings, etc., the manufacturers of cotton, silk and woolen goods, clothing, etc.

In constructing monthly average rates from weekly averages for call money, time money or commercial paper, if the week-end (Saturday) occurred on the 1st or 2d of the month, it was considered as a week entirely in the preceding month. If the week-end occurred on the 4th, 5th or 6th of the month, the week was considered as entirely in the later month. If it occurred on the 3d of the month, the weeks average was considered a quotation for half a week in the earlier month and half a week in the later month.

Most of the monthly rates were constructed from weekly figures, except when conditions were so disturbed as to make it necessary to examine daily rates. In such disturbed times the *Chronicle* generally quoted daily rates or at least discussed them. When the *Chronicle* quoted them, no other source was commonly referred to.

In constructing monthly call rate averages from weekly rates, the first operation (with the data before 1890) was to obtain a set of *weekly* average rates. The *Chronicle* commonly quoted a high rate and a low rate for the week. If, for any particular week, the range between these rates was quite small, their arithmetic average was considered to be the weekly average rate.

But the actual 'high' and 'low' and estimated 'ruling' weekly rates given by the *Financial Reviews* back to the beginning of 1890 show in figures a condition that the *Chronicle* in the earlier years had so often verbally described. Almost invariably, when the difference between the 'high' rate and the 'low' rate is at all large, the 'ruling' rate is much closer to the 'low' than the 'high' rate. As we were unable to invent an 'average' (beyond the harmonic, for example) that gave a good description of the relation, we constructed a nomograph (designed to fit the *Financial Review* figures as closely as possible) from which, given a 'high' and a 'low' rate, it was possible to read a 'ruling' rate. When, in the period *before* 1890, the weekly range was large and reliable daily rates were not obtainable, we used this nomograph (in conjunction with any *verbal* comment) to calculate a weekly average or 'ruling' rate. If reliable daily rates were obtainable we used them to construct the weekly average, having first used the nomograph (and verbal comment) to obtain a daily average for any day in which the range was abnormally large.

We believe this procedure gives a much better approximation to a weighted average of the rates of all the loans of the week than can be obtained by a blind use of arithmetic averages of high and low rates. But it naturally results in a series with no such stupendous peaks as series based on arithmetic averaging.



PUBLICATIONS OF THE NATIONAL BUREAU OF ECONOMIC RESEARCH

- *1 INCOME IN THE UNITED STATES
W. C. MITCHELL, W. I. KING, F. R. MACAULAY AND O. W. KNAUTH;
Volume I (1921) Summary 152 pp.
- 2 *Volume II* (1922) Details 440 pp., \$5.15
- 3 DISTRIBUTION OF INCOME BY STATES IN 1919 (1922)
OSWALD W. KNAUTH 30 pp., \$1.30
- *4 BUSINESS CYCLES AND UNEMPLOYMENT (1923) 405 pp.
By the NATIONAL BUREAU STAFF and sixteen COLLABORATORS
- *5 EMPLOYMENT, HOURS AND EARNINGS, UNITED STATES, 1920-
22 (1923) 147 pp.
WILLFORD I. KING
- 6 THE GROWTH OF AMERICAN TRADE UNIONS, 1880-1923 (1924)
LEO WOLMAN 170 pp., \$2.50
- 7 INCOME IN THE VARIOUS STATES: ITS SOURCES AND DIS-
TRIBUTION, 1919, 1920 AND 1921 (1925) 306 pp., \$3.50
MAURICE LEVEN
- 8 BUSINESS ANNALS (1926) 380 pp., \$2.50
By WILLARD L. THORP, with an introductory chapter, *Business Cycles*
as Revealed by *Business Annals*, by WESLEY C. MITCHELL
- 9 MIGRATION AND BUSINESS CYCLES (1926) 256 pp., \$2.50
HARRY JEROME
- 10 BUSINESS CYCLES: THE PROBLEM AND ITS SETTING (1927)
WESLEY C. MITCHELL 489 pp., \$5.00
- *11 THE BEHAVIOR OF PRICES (1927) 598 pp.
FREDERICK C. MILLS
- 12 TRENDS IN PHILANTHROPY (1928) 78 pp., \$1.00
WILLFORD I. KING
- 13 RECENT ECONOMIC CHANGES (1929) 2 vol., 950 pp., \$7.50
By the NATIONAL BUREAU STAFF and fifteen COLLABORATORS
- 14 INTERNATIONAL MIGRATIONS 1,112 pp., \$7.00
Volume I, Statistics (1929), compiled by IMRE FERENCZI of the Inter-
national Labour Office, and edited by WALTER F. WILLCOX
- 18 *Volume II*, Interpretations (1931), edited by WALTER F. WILLCOX
715 pp., \$5.00
- *15 THE NATIONAL INCOME AND ITS PURCHASING POWER (1930) 394 pp.
WILLFORD I. KING
- 16 CORPORATION CONTRIBUTIONS TO ORGANIZED COMMU-
NITY WELFARE SERVICES (1930) 347 pp., \$2.00
PIERCE WILLIAMS and FREDERICK E. CROXTON
- 17 PLANNING AND CONTROL OF PUBLIC WORKS (1930)
LEO WOLMAN 260 pp., \$2.50
- *19 THE SMOOTHING OF TIME SERIES (1931) 172 pp.
FREDERICK R. MACAULAY

- 20 THE PURCHASE OF MEDICAL CARE THROUGH FIXED PERIODIC PAYMENT (1932) PIERCE WILLIAMS 308 pp., \$3.00
- *21 ECONOMIC TENDENCIES IN THE UNITED STATES: ASPECTS OF PRE-WAR AND POST-WAR CHANGES (1932) 639 pp.
FREDERICK C. MILLS
- 22 SEASONAL VARIATIONS IN INDUSTRY AND TRADE (1933)
SIMON KUZNETS 455 pp., \$4.00
- 23 PRODUCTION TRENDS IN THE UNITED STATES SINCE 1870 (1934) ARTHUR F. BURNS 363 pp., \$3.50
- 24 STRATEGIC FACTORS IN BUSINESS CYCLES (1934)
JOHN MAURICE CLARK 238 pp., \$1.50
- 25 GERMAN BUSINESS CYCLES, 1924-1933 (1934) 288 pp., \$2.50
CARL T. SCHMIDT
- 26 INDUSTRIAL PROFITS IN THE UNITED STATES (1934)
RALPH C. EPSTEIN 678 pp., \$5.00
- 27 MECHANIZATION IN INDUSTRY (1934) 484 pp., \$3.50
HARRY JEROME
- 28 CORPORATE PROFITS AS SHOWN BY AUDIT REPORTS (1935)
WILLIAM A. PATON 151 pp., \$1.25
- 29 PUBLIC WORKS IN PROSPERITY AND DEPRESSION (1935)
ARTHUR D. GAYER 460 pp., \$3.00
- 30 EBB AND FLOW IN TRADE UNIONISM (1936)
LEO WOLMAN 251 pp., \$2.50
- 31 PRICES IN RECESSION AND RECOVERY (1936)
FREDERICK C. MILLS 561 pp., \$4.00
- 32 NATIONAL INCOME AND CAPITAL FORMATION, 1919-1935 (1937)
SIMON KUZNETS 100 pp., 8 $\frac{1}{4}$ x 11 $\frac{3}{4}$, \$1.50
- 33 SOME THEORETICAL PROBLEMS SUGGESTED BY THE MOVEMENTS OF INTEREST RATES, BOND YIELDS AND STOCK PRICES IN THE UNITED STATES SINCE 1856 (1938) 500 pp., \$5.00
FREDERICK R. MACAULAY

STUDIES IN FINANCE

A PROGRAM OF FINANCIAL RESEARCH (1937)

- I Report of the Exploratory Committee on Financial Research 91 pp., \$1
- II Inventory of Current Research on Financial Problems 253 pp., \$1.50

CONFERENCE ON RESEARCH IN NATIONAL INCOME AND WEALTH

STUDIES IN INCOME AND WEALTH, *Volume I* (1937) 368 pp., \$2.50

IN PRESS

COMMODITY FLOW AND CAPITAL FORMATION, *Volume I*
SIMON KUZNETS 320 pp., 8 $\frac{1}{4}$ x 11 $\frac{3}{4}$, \$5.00

THE BULLETIN

Subscription to the National Bureau *Bulletin* (5 issues, \$1). Single copies, 25¢, except for the issues marked 50¢.

1934

- 49 NATIONAL INCOME, 1929-32, SIMON KUZNETS
- 50 RECENT CORPORATE PROFITS, SOLOMON FABRICANT
- 51 RECENT CHANGES IN PRODUCTION, CHARLES A. BLISS
- 52 GROSS CAPITAL FORMATION, 1929-33, SIMON KUZNETS 50¢
- 53 CHANGES IN PRICES, MANUFACTURING COSTS AND INDUSTRIAL PRODUCTIVITY, 1929-1934, FREDERICK C. MILLS

1935

- 54 WAGES AND HOURS UNDER THE CODES OF FAIR COMPETITION, LEO WOLMAN
- 55 PROFITS, LOSSES AND BUSINESS ASSETS, 1929-34, SOLOMON FABRICANT
- 56 ASPECTS OF MANUFACTURING OPERATIONS DURING RECOVERY, FREDERICK C. MILLS 50¢
- 57 THE NATIONAL BUREAU'S MEASURES OF CYCLICAL BEHAVIOR, WESLEY C. MITCHELL and ARTHUR F. BURNS 50¢
- *58 PRODUCTION IN DEPRESSION AND RECOVERY, CHARLES A. BLISS

1936

- 59 INCOME ORIGINATING IN NINE BASIC INDUSTRIES, 1919-1934, SIMON KUZNETS 50¢
- 60 MEASURES OF CAPITAL CONSUMPTION, 1919-1933, SOLOMON FABRICANT
- 61 PRODUCTION DURING THE AMERICAN BUSINESS CYCLE OF 1927-1933, WESLEY C. MITCHELL and ARTHUR F. BURNS 50¢
- 62 REVALUATIONS OF FIXED ASSETS, 1925-1934, SOLOMON FABRICANT
- 63 THE RECOVERY IN WAGES AND EMPLOYMENT, LEO WOLMAN

1937

- 64 A PROGRAM OF FINANCIAL RESEARCH
Report of the Exploratory Committee on Financial Research
- 65 NON-FARM RESIDENTIAL CONSTRUCTION, 1920-1936, DAVID L. WICKENS and RAY R. FOSTER
- *66 NATIONAL INCOME, 1919-1935, SIMON KUZNETS
- 67 TECHNICAL PROGRESS AND AGRICULTURAL DEPRESSION, EUGEN ALTSCHUL and FREDERICK STRAUSS 50¢
- 68 UNION MEMBERSHIP IN GREAT BRITAIN AND THE UNITED STATES, LEO WOLMAN

* Out of print

NATIONAL BUREAU OF ECONOMIC RESEARCH
1819 BROADWAY, NEW YORK

EUROPEAN AGENT: MACMILLAN & CO., LTD.
ST. MARTIN'S STREET, LONDON, W. C. 2